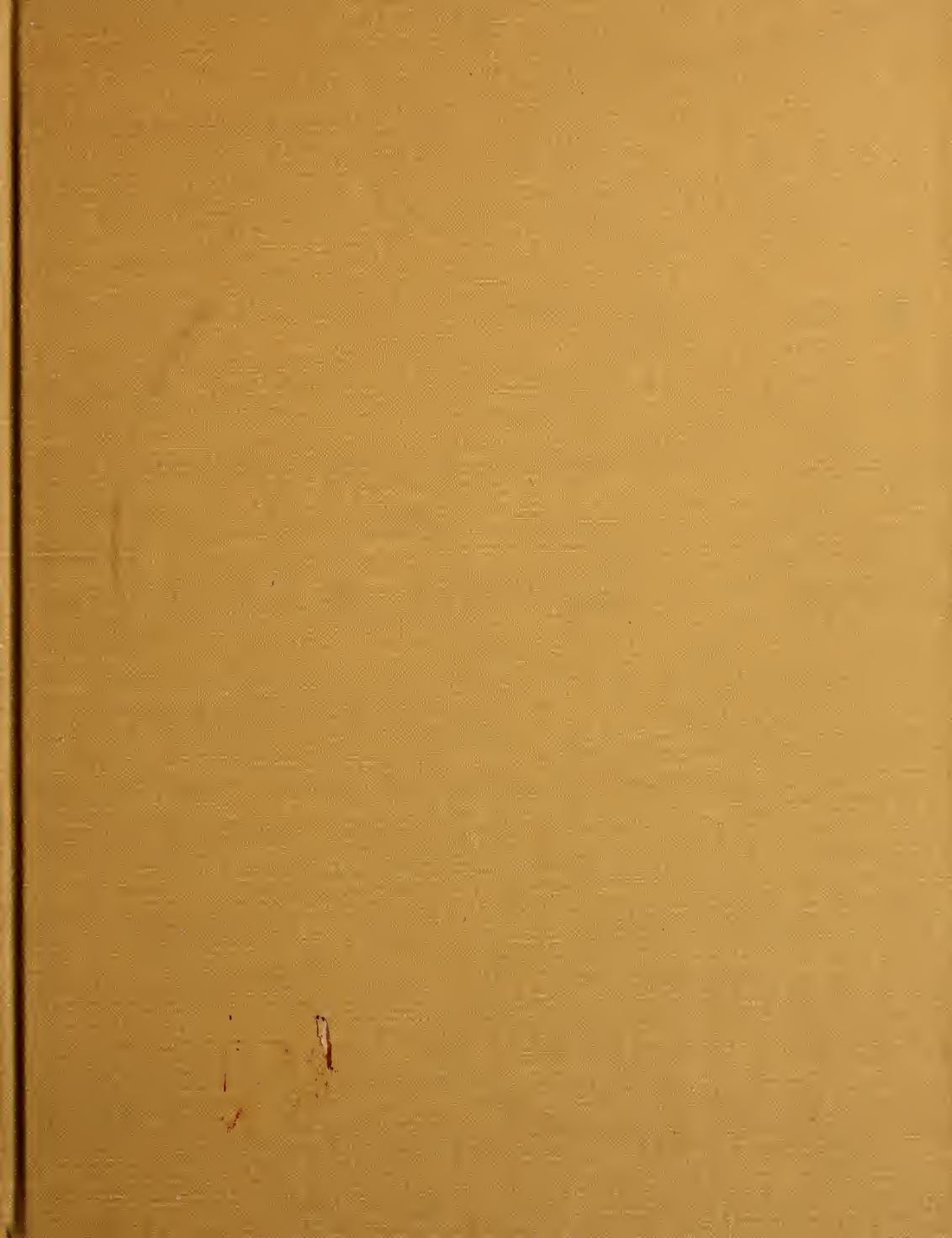




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GNP: An Overview of Source Data and Estimating Methods

Gross National Product in Current and Constant Dollars			
National Income by Type of Income		1983	1984
1983	1984		
National income		2,646.2	2,741.2
Compensation of employees		1,639.2	1,601.0
Wages and salaries		1,519.3	1,483.3
Government and non-government enterprises		305.2	305.2
Other income		398.6	437.9
Supplements to wages and salaries		418.1	432.0
Employer's contribution for insurance		328.2	349.6
Other income		173.1	185.5
Proprietors' income with IVA		121.7	134.1
Rental income with IVA		14.8	28.2
Personal dividend income		167.9	120.2
Personal interest income		58.3	62.5
Transfer payments		70.3	77.7
Old age, survivors' and health insurance benefits		376.3	433.7
Government unemployment benefits		103.0	416
Veterans benefits		29.1	
Government benefits			
Other transfer payments			
Other income			
Net exports of goods and services			
Exports			
Imports			
Government purchases of goods and services			
Federal			
National defense			
Nondefense			
State and local			
Gross national product		3,301.8	3,667
Personal consumption expenditures		2,155.9	2
Durable goods		279.8	
Nondurable goods		801	
Services		1,072	
Gross private domestic investment			
Fixed investment			
Nonresidential			
Structures			
Producers' durable equipment			
Residential			
Nonfarm structures			
Farm structures			
Producers' durable equipment			
Change in business inventories			
Nonfarm			
Farm			

METHODOLOGY PAPERS: U.S. National Income and Product Accounts



U.S. DEPARTMENT OF COMMERCE
Bureau of Economic Analysis

September 1987
BEA-MP-4



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GNP: An Overview of Source Data and Estimating Methods

METHODOLOGY PAPERS: U.S. National Income and Product Accounts

September 1987

U.S. DEPARTMENT OF COMMERCE

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Comments about the paper are invited. Comments, as well as questions about the material in the paper, should be directed to: Associate Director for National Economic Accounts, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, DC 20230.

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Introduction

GNP is the most widely used measure of the Nation's production. It is used to track the cyclical ups and downs of the economy and to monitor economic growth. In conjunction with measures of labor and capital input, it provides indicators of the Nation's productivity. Thus, GNP is a primary focus in the analysis of the current economic situation, in macroeconomic forecasting, and in policy formulation.

The usefulness of GNP stems in part from its being the keystone of a set of measures that provide answers to two questions: First, what is the output of the economy—its size, its composition, and its use? Second, what is the economic process or mechanism by which output is produced and distributed? These measures are in the framework of a set of accounts—the national income and product accounts (NIPA's)—that show production, distribution, consumption, and saving. The summary NIPA system is shown on pages 16 and 17 of the July 1987 issue of the SURVEY OF CURRENT BUSINESS.

The first account in the summary system, the national income and product account, shows GNP measured in two ways (table 1). On the right side, GNP

is measured as the sum of goods and services sold to final users. On the left side, GNP is measured as the sum of income payments and other costs. The right side, which corresponds to table 1.1 of the set of NIPA tables, shows personal consumption expenditures for goods and services and the other "product" components. The left side shows the compensation of employees and the other "income" components; most of these entries appear as components of national income in NIPA table 1.14; the remainder appear in table 1.9, which shows the relation among major NIPA income and product aggregates.

As explained in "An Introduction to National Economic Accounting," the national income and product account is what is referred to as a "production account." [18] Specifically, it is the production account for the Nation. Although most of the Nation's production takes place in the business sector, production also takes place in the other three sectors of the economy—households, government, and foreign. Thus, this account can be viewed as the consolidation

¹Bracketed numbers refer to items in the second part of this article.

Table 1.—National Income and Product Account, 1986

(Billions of dollars)

Line		Line	
1	Compensation of employees	27	Personal consumption expenditures
2	Wages and salaries	28	Durable goods
3	Disbursements	29	Nondurable goods
4	Wage accruals less disbursements and	30	Services
5	Supplements to wages and salaries	31	Gross private domestic investment
6	Employer contributions for social insurance	32	Fixed investment
7	Other labor income	33	Nonresidential
8	Proprietors' income with inventory valuation and capital consumption	34	Structures
9	adjustments	35	Producers' durable equipment
10	Rental income of persons with capital consumption	36	Residential
11	adjustments	37	Change in business inventories
12	Corporate profits with inventory valuation and capital consumption	38	Net exports of goods and services
13	adjustments	39	Exports
14	Profits before tax	40	Imports
15	Profits after tax	41	Government purchases of goods and services
16	Dividends	42	Federal
17	Undistributed profits	43	National defense
18	Inventory valuation adjustment	44	Nondefense
19	Capital consumption adjustment	45	State and local
20	Net interest		
21	National income		
22	Business transfer payments		
23	Indirect business tax and nontax liability		
24	Less: Subsidies less current surplus of government enterprises		
25	Charges against net national product		
26	Capital consumption allowances with capital consumption adjustment		
27	Charges against gross national product		
28	Statistical discrepancy		
29	GROSS NATIONAL PRODUCT		



of the production accounts for all economic transactors, based either on actual production accounts or those that can be assumed to exist. The national income and product account also serves as the appropriation account for the business sector; that is, it records the business sector's current income, current outlays, and saving. The other accounts in the summary system are appropriation accounts for the three other sectors and a consolidated saving-investment account for the domestic sectors.

The first part of this article summarizes the source data and estimating methods used to prepare the current- and constant-dollar estimates of GNP. This overview of GNP complements the more detailed information that is becoming available in other papers in this series on the conceptual framework of the NIPA's and the methodology used in preparing the estimates. The second part provides a directory of the information about GNP that has appeared in recent years in the SURVEY and other BEA publications.

Income-side components

Compensation of employees (line 1): The income accruing to employees as remuneration for their work. It is the sum of wages and salaries and of supplements to wages and salaries.

Wages and salaries (line 2): The monetary remuneration of employees, including the compensation of corporate officers; commissions, tips, and bonuses; and receipts in kind that represent income to the recipients. It consists of disbursements (line 3) and wage accruals less disbursements (line 4). In disbursements, retroactive wages are counted when paid rather than when accrued.

Supplements to wages and salaries (line 5): Employer contributions for social insurance and other labor income. **Employer contributions for social insurance (line 6)** includes employer payments under the following programs: Federal old-age, survivors, disability, and hospital insurance; State and Federal unemployment insurance; railroad retirement and unemployment insurance; government employee unemployment insurance and retirement; military medical insurance; and publicly administered workers' compensation. **Other labor income (line 7)** consists primarily of employer contributions to private pension and private welfare funds, including privately administered workers' compensation funds.

Proprietors' income with inventory valuation and capital consumption adjustments (line 8): The income, including income in kind, of sole proprietorships and partnerships and of tax-exempt cooperatives. The imputed net rental income of owner-occupants of farm dwellings is included. Dividends and monetary interest received by proprietors of nonfinancial business and rental incomes received by persons not primarily engaged in the real estate business are excluded; these incomes are included in dividends, net interest, and rental income of persons. The inventory valuation adjustment is described following corporate profits with inventory valuation and capital consumption adjustments, and the capital consumption adjustment is described following capital consumption allowances with capital consumption adjustment.

Rental income of persons with capital consumption adjustment (line 9): The income of persons from the rental of real property, except the income of persons primarily engaged in the real estate business; the imputed net rental income of owner-occupants of nonfarm dwellings; and the royalties received by persons from patents, copyrights, and rights to natural resources. The capital consumption adjustment is described following capital consumption allowances with capital consumption adjustment.

Corporate profits with inventory valuation and capital consumption adjustments (line 10): The income of organizations treated as corporations in the NIPA's. These organizations

consist of all entities required to file Federal corporate tax returns, including mutual financial institutions and cooperative subject to Federal income tax; private noninsured pension funds nonprofit organizations that primarily serve business; Federal Reserve banks; and federally sponsored credit agencies. The income is that arising in current production. With several differences, this income is measured as receipts less deductions as defined in Federal tax law. Among these differences are: Receipts exclude capital gains and dividends received, deductions exclude depletion and capital losses, inventory withdrawals are valued at current replacement cost, and depreciation is on a consistent accounting basis and valued at current replacement cost. Because national income is defined as the income of U.S. residents, its profits component includes income earned abroad by U.S. corporations and excludes income earned in the United States by foreigners. The inventory valuation adjustment is described below, and the capital consumption adjustment is described following capital consumption allowances with capital consumption adjustment.

Profits before tax (line 11): The income of organizations treated as corporations in the NIPA's, as described above, except that it reflects the inventory and depreciation accounting practices used for Federal income tax returns. It consists of profits tax liability, dividends, and undistributed corporate profits. This measure is sometimes referred to as "book profits."

Profits tax liability (line 12): The sum of Federal, State, and local income taxes on all corporate earnings; these earnings include capital gains and other income excluded from profits before tax. The taxes are measured on an accrual basis, net of refunds and applicable tax credits.

Profits after tax (line 13): Profits before tax less profits tax liability. It consists of dividends and undistributed corporate profits. **Dividends (line 14)** is payments in cash or other assets, excluding the corporation's own stock, made by corporations located in the United States and abroad to stockholders who are U.S. residents. The payments are measured net of dividends received by U.S. corporations. Dividends paid to State and local government social insurance funds and general government are included. **Undistributed profits (line 15)** is corporate profits after tax less dividends.

Inventory valuation adjustment (line 16): For corporations, the difference between the cost of inventory withdrawals as valued in determining profits before tax and the cost of withdrawals valued at current replacement cost. A similar adjustment is applied to nonfarm proprietors' income.

Net interest (line 18): Interest paid by business less interest received by business, plus interest received from foreigners less interest paid to foreigners. Interest payments on mortgage and home improvement loans are counted as interest paid by business, because homeowners are



GNP and the other entries in the national income and product account are defined next.

Measures of production.—As indicated, the total on both sides of the national income and product account is GNP. *Gross national product*, to use the words that underlie the familiar acronym, is defined as the market value of the goods and services produced by labor and property supplied by residents of the United States. The product side of the account shows that GNP is the sum of purchases of goods

and services by persons and government, gross private domestic investment (including the change in business inventories), and net exports (exports less imports). This sum is the market value of final sales and business inventory change. To avoid double counting, the summing does not include business purchases of goods and services on current account—for example, business purchases of paper to make books; their value is reflected in the value of final sales and business inventory change. The investment component of GNP is

treated as businesses in the NIPA's. In addition to monetary interest, net interest includes imputed interest. The imputed interest payments by financial institutions other than life insurance carriers and private noninsured pension plans to persons, governments, and foreigners have imputed service charges as counterentries in GNP; they are included in personal consumption expenditures, in government purchases, and in exports, respectively.

Business transfer payments (line 20): Payments by business to persons for which they do not perform current services. These payments include liability payments for personal injury, corporate gifts to nonprofit institutions, and consumer bad debts—i.e., defaults by consumers on debts owed to business.

Indirect business tax and nontax liability (line 21): Tax liabilities (except employer contributions for social insurance) that are chargeable to business expense in the calculation of profit-type incomes and certain other business liabilities to government agencies (except government enterprises) treated as taxes. Indirect business taxes include sales, excise, and property taxes, and the windfall profit tax on crude oil production. Taxes on corporate incomes are excluded; these taxes cannot be calculated until profits are known, and in that sense are not a business expense. Nontaxes include regulatory and inspection fees, special assessments, fines and penalties, rents and royalties, and donations. Nontaxes exclude business purchases from government of goods and services that are similar to business purchases of intermediate products from other businesses. Government receipts from the sale of such products are netted against government purchases so that they do not appear in GNP.

Subsidies less current surplus of government enterprises (line 22). Subsidies are the monetary grants paid by government to business, including government enterprises at another level of government. The current surplus of government enterprises is their sales receipts and subsidies received from other levels of government less their current expenses. In the calculation of their current surplus, no deduction is made for depreciation charges and net interest paid. Subsidies and current surplus are combined because deficits incurred by government enterprises may result from selling goods to businesses at lower than market prices in lieu of giving them subsidies. For the same reason, the current surplus of government enterprises is not counted as a profit-type income and, accordingly, not as a factor charge.

Capital consumption allowances with capital consumption adjustment (line 24): Capital consumption based on the use of uniform service lives, straight-line depreciation, and replacement cost. For nonprofit institutions serving individuals, it is the value of the current services of the fixed capital assets owned and used by these institutions; it is included in personal consumption expenditures. Capital consumption allowances consists of depreciation charges and

accidental damage to fixed capital. For nonfarm business and corporate farms, depreciation is as reported on Federal income tax returns. For noncorporate farms, nonprofit institutions serving individuals, tax-exempt cooperatives, and owner-occupied houses, depreciation is calculated by BEA based on their expenditures for fixed capital, uniform service lives, straight-line depreciation, and historical cost. **Capital consumption adjustment** (line 17) for corporations is the difference between tax-return-based capital consumption allowances and capital consumption based on the use of uniform service lives, straight-line depreciation, and replacement cost. Similar adjustments are calculated for proprietors' income, rental income of persons, and nonprofit institutions serving individuals.

Statistical discrepancy (line 26): GNP less charges against GNP. It arises because GNP and charges against GNP are estimated independently.

Product-side components

Personal consumption expenditures (line 27): Goods and services purchased by individuals, operating expenses of nonprofit institutions serving individuals, and the value of food, fuel, clothing, housing, and financial services received in kind by individuals. Net purchases of used goods are also included. Purchases of residential structures by individuals and nonprofit institutions serving individuals are classified as gross private domestic investment.

Gross private domestic investment (line 31): Fixed capital goods—structures and equipment—purchased by private business and nonprofit institutions, and the value of the change in the physical volume of inventories held by private business. The former include private purchases of new residential structures purchased for tenant or owner occupancy. Net purchases of used goods are also included.

Net exports of goods and services (line 38): Exports less imports of goods and services. **Exports** (line 39) is goods and services provided by U.S. residents to foreigners. **Imports** (line 40) is goods and services provided by foreigners to U.S. residents. For both exports and imports, services include services of labor and capital, for which factor incomes are paid. Imports are deducted because, although they are included in the expenditure and inventory change components of GNP, they are not part of national production.

Government purchases of goods and services (line 41): Compensation of government employees and purchases from business and from foreigners. Transfer payments, interest paid by government, and subsidies are excluded. Gross investment by government enterprises is included, but their current outlays are not. Net purchases of used goods are included; sales and purchases of land and financial assets are excluded.



measured before deduction of charges for consumption of fixed capital.

The income side shows *charges against GNP* (line 25), the costs incurred and the profits earned in the production of GNP. This sum equals GNP, except for the statistical discrepancy. The factor charges—compensation of employees, proprietors' income, rental income of persons, corporate profits, and net interest—represent the incomes of the factors of production (labor and property). These factor incomes are measured before deduction of taxes on those incomes and after deduction of depreciation and other allowances for capital consumed in production. The total of these incomes is a measure of production called national income. Three nonfactor charges—business transfer payments, indirect business taxes, and the current surplus of government enterprises—are added to national income and one—subsidies—is subtracted to yield charges against net national product, yet another measure of production. Charges for the consumption of fixed capital are added to charges against net national product to yield charges against GNP.

The four measures of production that have been mentioned so far differ from each other because of distinctions that are made between measures at factor cost and at market value (that is, including nonfactor charges as well as factor costs) and between measures that are gross and net of capital consumption. GNP and charges against GNP are gross market value measures. *National income* (line 19), the income that originates in the production of the goods and services attributable to labor and property supplied by residents of the United States, is a net factor cost measure (line 19). *Charges against net national product* (line 23), the income that originates in, plus the nonfactor charges incurred in, the production of the goods and services attributable to labor and property supplied by residents of the United States, is a net market value measure.

One further basic distinction can be made in defining the measures of production. This distinction is between national measures and domestic measures. As indicated by its name, the national income and product account presents measures on a national basis. National measures relate to the ownership of the factors

of production; they refer to production attributable to labor and property supplied by residents of a country. Domestic measures relate to the physical location of the factors of production; they refer to production attributable to all labor and property located in a country. The national measures differ from the domestic measures by the net inflow—that is, inflow less outflow—of labor and property incomes from abroad.

The choice of a measure of production from this array depends on the use to which it will be put. For example, national income is often used in studies dealing with the allocation of factors of production to various uses. A market price measure, such as GNP, is usually preferred for studies of economic behavior and welfare, because market price is the basis for choice among alternative products. Gross domestic product, rather than GNP, is the most widely used measure of production in other countries, and thus it is often used in international comparisons.

Components.—The income and product components of GNP are defined in the box on pages 2 and 3. They are in the order of the line numbers in the national income and product account, starting on the income side and proceeding to the product side. These components are often defined by reference to the purchaser of the goods and services or to the payor or recipient of the income. "Business," in the main, refers to corporate and noncorporate private entities organized for profit. Mutual financial institutions, private noninsured pension funds, cooperatives, nonprofit organizations that primarily serve business, Federal Reserve banks, and federally sponsored credit agencies are also included as part of business. Government enterprises (such as the Commodity Credit Corporation and State-owned liquor stores) are treated in some respects like private business and in other respects like other government agencies. "Persons" refers to individuals, nonprofit institutions serving individuals, private noninsured welfare funds, and private trust funds. ("Households and institutions" excludes the two kinds of funds.) "Government" refers to all Federal, State, and local government agencies. "Foreigners" refers to foreign residents who are transactors with U.S. residents; "rest of the world" is used with the same meaning.



Part I.

Source Data and Estimating Methods

THIS part summarizes the source data and estimating methods used to prepare GNP. Such a summary encourages appropriate use of the estimates by making the content of the income and product components more concrete than did the definitions. For example, the definition of fixed investment refers to capital goods "purchased;" the summary methodology clarifies that the estimate for structures is of the value put in place in a time period, which would differ from the full purchase price if the construction is underway in several time periods. Such a summary also makes explicit that the component estimates rely in varying degrees on proxies and judgment—a reminder that, although the estimates are useful analytical tools, they cannot be precision instruments.

Source data are the facts and figures BEA uses to prepare the estimates, and estimating methods are the steps BEA takes to conform the source data to the concepts and definitions of the NIPA's and to fill in gaps in data coverage. Taken together, source data and estimating methods are often referred to as "methodology." The summary in this article highlights features of the methodology that serve the purposes just mentioned; they throw light on the content of the components and provide indications of reliability.

The methodology described—first for current-dollar estimates and then for constant-dollar estimates—is that in use as of the July 1987 annual revision. Methodology is not fixed once and for all. First, source data emerge and disappear, and BEA adapts the estimating methods accordingly. Second, often independently of circumstances that lead to these adaptations, BEA improves the estimating methods. In recent years, a number of improvements were associated with the expanding use of computers; most obvious perhaps is the ability to handle a finer level of estimating detail in the allotted timeframe. Finally, the economy changes, and BEA updates the methodology to ensure that the estimates continue to provide a reliable picture of the transactions and transactors in the economy. One notable instance of methodological change—the improvements in the constant-dollar estimates and associated price measures over the last decade—is evident from the directory of information about the estimates, in the second part of the article. In this instance, the impetus was the inflation that began in the early 1970's, and the

improvements involved developing new source data, refining other source data, and adapting the estimating methods to include more sophisticated treatments and to handle more detail.

Current-dollar estimates

Preview of source data and the estimating cycle.—With few exceptions, the data used in preparing the estimates are collected for purposes other than the preparation of the income and product estimates. Data collected by Federal Government agencies provide the backbone of the estimates, although they are supplemented by data from trade associations, businesses, organizations, and other private sources. The government data come from a number of agencies, mainly Commerce Department's Census Bureau, Treasury Department's Internal Revenue Service, Labor Department's Bureau of Labor Statistics, Office of Management and Budget, and Agriculture Department. Some government-collected data, referred to as "administrative" data, are byproducts of government functions such as welfare and social security programs, tax collection, defense, and regulation. Nonadministrative data, sometimes referred to as "general purpose" or "statistical" data, include the periodic economic and population censuses and a wide range of sample surveys, such as those that collect data on manufacturing activity, corporate profits, and the labor force status of households. Of the relatively few items for which BEA itself collects data used to estimate the NIPA's, most refer to international transactions. These include investment by foreigners in the United States and by U.S. residents in foreign countries.

The article about the annual NIPA revision in the July 1987 issue of the SURVEY highlights an important characteristic of the estimates: The source data on which they depend improve in quantity and quality as the estimates progress through the estimating cycle. A cycle usually takes 5 years and runs from three estimates of the current quarter to three (usually) annual revisions and, finally, to a comprehensive revision (often referred to as a "benchmark" revision). For the preliminary estimate of GNP for the current quarter, which is released about 3 weeks after the end of that quarter, source data provide less than full coverage and usually are subject to revision. The data available for



this estimate are series collected monthly. One important series, retail sales, is released early in the month following collection, and the preliminary GNP estimate is timed to incorporate it. Thus, the preliminary estimate incorporates 3 months of data for that series. The preliminary estimate also incorporates 3 months of data for auto and truck sales and for employment, hours, and earnings. For several other important monthly series, 2 months of data are available.

In the 2 months immediately following the preliminary estimate, BEA prepares two revised estimates of GNP for the current quarter. These estimates, referred to as the "first revision" and "second revision," each incorporate both revised and previously unavailable monthly data. As well, they incorporate three major sets of quarterly data. One set is the data on domestic corporate profits. Except for the fourth quarter, a preliminary corporate profits estimate is released with the first revision of GNP and a revised estimate with the second revision of GNP; for the fourth quarter, the corporate profits schedule lags 1 month. The second set is the data on foreign transactions from the BEA balance of payments accounts. With the exception of merchandise trade data, most of the source data underlying these accounts, including the BEA surveys of direct investment, are quarterly. Data from the balance of payments are incorporated in the second revision. The third set is the data on assets from the flow of funds accounts prepared by the Federal Reserve Board, also incorporated in the second revision.

Most quarterly and monthly source data are based on samples. The sample-based data include the monthly Census Bureau reports on shipments or sales and inventories of manufacturing, wholesale trade, and retail trade (the sales series mentioned earlier); the corporate profits data for manufacturing, mining, and trade in the *Quarterly Financial Report* prepared by the Census Bureau; the monthly data on employment, hours, and earnings compiled from reports of nonfarm establishments by the Bureau of Labor Statistics and the monthly data on employment collected from households by the Census Bureau in the current population survey, both published by the Bureau of Labor Statistics in *Employment and Earnings*; and the monthly data reported by the Census Bureau in *Value of New Construction Put in Place*.

Several sets of source data are not samples and provide complete or nearly complete coverage. One monthly set of data, that reported by the Census Bureau in *Highlights of U.S. Export and Import Trade*, is from documentation intended to cover nearly all goods as they enter or leave the country. (The monthly trade data and the monthly construction data that are used for current quarterly estimates are not replaced by annual data based on a more inclusive collection system

and are used for annual estimates as well.) Two other sets that provide complete coverage are the Federal receipts and expenditures in the Treasury Department report referred to as the *Monthly Treasury Statement* and the unit sales of autos and trucks from a trade source.

Ordinarily, the GNP estimates for the most recent calendar year and usually the 2 preceding years are revised each year in July. These annual revisions are timed to incorporate annual source data, although they also incorporate quarterly data released too late to be used in the current quarterly estimates. In addition, the seasonal adjustments applied to the source data are updated. (See the box on page 16 for more about seasonal adjustment.)

Annual data are usually based on samples. The schedule of one of the sample-based sets of annual data—data related to business income from tabulations of tax returns—is the major reason for the third annual revision. These data are compiled by the Internal Revenue Service and published in its *Statistics of Income* series. Data on sole proprietors and partnerships become available for the second annual revision, and data on corporations become available for the third.

The sample-based data also include the annual counterparts of the data on shipments or sales and inventories mentioned earlier (reported by the Census Bureau in the *Annual Survey of Manufactures*, the *Annual Retail Trade Report*, and the *Annual Wholesale Trade Report*); receipts of service establishments reported by the Census Bureau in the *Service Annual Survey*; data on agriculture—production, inventories, costs, and more—collected in several surveys by the Department of Agriculture; receipts and expenditures of State and local governments reported by the Census Bureau in *Governmental Finances*; and data collected by the Census Bureau in the biennial housing survey.

The annual revisions also incorporate data compiled by the Bureau of Labor Statistics on wages and salaries of employees covered by State unemployment insurance. These data, published in *Employment and Wages*, have provided nearly complete coverage of private nonfarm and of State and local government employees in recent years. (Data from this source and from the Internal Revenue Service tabulations mentioned above are not replaced by data based on a more inclusive collection system and are used for comprehensive revisions as well as for annual revisions.)

Comprehensive revisions are carried out about every 5 years. The comprehensive revisions—which also incorporate definitional and classificational changes—are timed to incorporate the quinquennial economic censuses; the year of the economic censuses is referred to as the "benchmark year." The source data available for the comprehensive revisions provide the most com-



plete coverage. Examples are the decennial census of population, the decennial census of housing (and its supplementary survey of residential finance), the quinquennial census of governments, and the quinquennial economic censuses, all collected by the Census Bureau. The economic censuses, currently conducted in years ending in "2" and "7," provide extensive data on manufactures, wholesale trade, retail trade, service industries, construction industries, agriculture, transportation, and mineral industries. (An alternative view of the use of source data is that these censuses are the major sources used to prepare BEA's input-output tables and that the input-output tables, in turn, are the single most important source for the comprehensive revisions of the NIPA's. The input-output tables provide the level for the product—that is, expenditures—components of GNP in the benchmark year.)

The data from these decennial and quinquennial censuses as well as data (such as from the tabulations of business tax returns and the unemployment insurance system) that are not replaced—that is, are considered final—determine the levels of the component estimates. Other source data are used to interpolate and extrapolate; as will be explained more fully in the next section, these source data provide the basis for the annual and quarterly changes in the level. Annual data are usually used to interpolate between and extrapolate from the final levels. Quarterly data are used to interpolate between and extrapolate from annual levels.

Notes to the sources and methods table.—Table 2 identifies the principal source data—those previewed as well as many others—and estimating methods used to prepare the current-dollar annual and quarterly estimates of GNP components. The components are as shown in table 1, starting on the income side and proceeding to the product side. The subcomponents in table 2, with their 1986 dollar values, are grouped according to the methodology used to prepare them.

The column in table 2 for annual estimates covers the several annual estimates in the estimating cycle; major differences in methodology as the estimates move through the annual revisions to a comprehensive revision are few enough to condense into a table. For example, for most goods in personal consumption expenditures (the first item on the product side), the table indicates one methodology for benchmark years and another for all other years.

The column for the quarterly estimates is a condensation in several respects. First, it refers to the preliminary estimates for the current quarter. That one estimate, rather than all of the current quarterly estimates, is described because more attention focuses on the "first look" at the quarter. Second, even for the preliminary estimate, the column does not detail how

many months of data are available nor whether the data are subject to revision by the source agency. Thus, the benefit of condensation is at the cost of not detailing the tradeoff between the timeliness of the preliminary estimate and the improved quantity and quality of source data available in the 2 following months.²

The information in the column for the quarterly estimates is generic; it fits any preliminary estimate for the current quarter. For users who want to track the actual data and resulting estimates, BEA prepares "Key Source Data and Projections for National Income and Product Estimates." This table, provided at the time of the preliminary estimates, shows the monthly figure for key source data that are available (and indicates whether the data are subject to revision by the source agency) and BEA's projected figures for data that are not available [41]. BEA is reformatting this table and plans to make it more accessible by putting it on the Commerce Department's Economic Bulletin Board.

Table 2 lists source data referring to a variety of different economic measures—wages and salaries, premiums, expenses, interest rates, mortgage debt, tax collections, unit sales, housing stock, employment, and average price, to name a few. For most components, the source data are "value data," that is, they embody both the quantity and price dimensions that are required for current-dollar estimates. In these cases, the methodology indicated in table 2 is the adjustment of the value data to derive estimates consistent with NIPA definitions and coverage. The descriptions of the adjustments to derive domestic corporate profits and change in business inventories are examples. Three

²The methodology for personal consumption expenditures illustrates the sequential introduction of source data in the current estimates. For the preliminary estimates, the key data available are: 3 months of retail sales (of which 2 months are subject to revision by the source agency); 3 months of unit sales of new motor vehicles, 1 month of information with which to allocate the unit sales among consumers and other purchasers, and 2 or 3 months of average list prices (which are subject to modification as more detailed information on models of cars sold, and thus actual retail prices, becomes available); and 1 or 2 months of data for services amounting to three-fifths of total services. The estimates for most of the remainder of personal consumption expenditures are extrapolations based either on related indicator series or on judgmental trends. For the first revision, revised retail sales for 2 months become available. For the second revision, information on sales of used cars and more data on several services—hospitals, electricity, natural gas, telephones, airline transportation, foreign travel, and insurance other than life insurance—become available.

The "Business Situation" in the SURVEY provides a footnote at the time of the preliminary estimates of GNP (January, April, July, and October) listing major source data, including the number of months for which they are available, for that GNP estimate. Notes to a table in the "Business Situation" in the 2 following months list source data, including revisions to earlier data, that subsequently became available and were incorporated in that estimate.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Income side (Charges against GNP of \$4,239.9 billion in 1986)			
Compensation of employees (\$2,504.9)	Wages and salaries: Private industries, State and local government, and rest of the world (\$1,956.8)	For most, annual tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics; for remainder, wages from a variety of sources (such as Dept. of Agriculture for farms and Railroad Retirement Board for railroad transportation) and indirect estimation for only a few cases (such as a percentage of revenues for tips not reported as wages).	For most private, wages and salaries derived, by industry, from Bureau of Labor Statistics monthly employment times earnings times hours; for State and local government and other private, judgmental trend.
	Wages and salaries: Federal (\$132.3)	Wages from the Office of Personnel Management and the Office of Management and Budget, <i>Budget of the United States</i> .	Same as annual.
	Employer contributions for social insurance (\$214.7)	Contributions from the Social Security Admin., other agencies administering social insurance programs, and Census Bureau surveys of State and local government retirement funds.	For Federal programs, BEA-derived wages and salaries of employees covered by the programs; for State and local government programs, judgmental trend.
	Other labor income (\$201.1)	Years except most recent—For private pension and profit-sharing funds, employer contributions from Internal Revenue Service tabulations of business tax returns when available and judgmental trend in other years; for group health and life insurance, mainly total premiums paid from trade sources and Health Care Financing Admin. and data on employer share from trade source; for workers' compensation, contributions from trade sources. Most recent year—For group health insurance, total premiums paid from Health Care Financing Admin.; for others in the category, judgmental trend.	Judgmental trend.
Proprietors' income with IVA and CCAAdj (\$289.8)	Nonfarm income (\$217.7)	Years except most recent—Income from Internal Revenue Service tabulations of business tax returns, adjusted for understatement of income on tax returns and for several conceptual differences. Most recent year—For construction, trade, and services, indicators of activity (such as value of housing put in place); for most others, judgmental trends.	Same as annual for most recent year.
	Nonfarm IVA (—\$0.2)	The IVA is described under the entry for corporate profits with IVA and CCAAdj.	
	Nonfarm CCAAdj (\$35.1)	The CCAAdj is described under the entry for capital consumption allowances with CCAAdj.	
	Farm income with IVA (\$45.4)	Based on Dept. of Agriculture data on net income, obtained by deriving gross earnings (cash receipts from marketing, inventory change, government payments, other cash income, and nonmoney income) and subtracting production expenses, adjusted to exclude corporate income from Internal Revenue Service tabulations of business tax returns.	Dept. of Agriculture projection adjusted for consistency with NIPA's.
	Farm CCAAdj (—\$8.1)	The CCAAdj is described under the entry for capital consumption allowances with CCAAdj.	

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Income side (Charges against GNP of \$1,239.9 billion in 1986)—Continued			
Rental income of persons with CCAAdj (\$16.7)	Rent from nonfarm nonresidential properties (\$10.4)	Years except the 2 most recent—Rents paid and received by business and government, adjusted for expenses associated with property (mainly depreciation, taxes, interest, and repairs), from Internal Revenue Service tabulations of business tax returns, Census Bureau surveys, and the <i>Budget of the United States</i> prepared by the Office of Management and Budget. Two most recent years—Judgmental trend	Same as annual for 2 most recent years.
	Rent from owner-occupied nonfarm housing (\$18.5)	Derived as space rent—see the entry for nonfarm housing in personal consumption expenditures—less related expenses, including maintenance and repair from Bureau of Labor Statistics quarterly consumer expenditure survey, mortgage debt from Federal Reserve Board times an interest rate, and property taxes from Census Bureau quarterly surveys of State and local tax collections.	For owner-occupied space rent, same as annual; for depreciation, interest, and taxes, based on estimates of these components; for other expenses, based on judgmental trend.
	Rent from tenant-occupied nonfarm housing (\$17.5)	Same as described under owner-occupied housing and adjusted to cover only rental income accruing to persons not primarily engaged in the real estate business.	Same as annual.
	Royalties (\$10.8)	Years except most recent—Internal Revenue Service tabulations of royalties reported on individual tax returns. Most recent year—Judgmental trend.	Same as annual for most recent year.
	Rent from farms owned by nonoperator landlords (\$5.1) CCAAdj (—\$45.5)	Prepared in conjunction with farm proprietors' income; see that entry. The CCAAdj is described under the entry for capital consumption allowances with CCAAdj.	Judgmental trend.
Corporate profits with IVA and CCAAdj (\$284.4)	Profits: Domestic, before tax (\$200.7)	Years except the 2 most recent—Receipts less deductions from Internal Revenue Service tabulations of business tax returns, adjusted to include in profits the depletion allowances on domestic minerals, income of the Federal Reserve and federally sponsored credit agencies, the excess of additions to bad debt reserves over losses actually incurred, and an estimate of the amount by which income on tax returns is understated and to exclude capital gains and losses on the sale of property and dividends received from domestic corporations. Two most recent years—Separately for about 70 industries, profits from Census Bureau quarterly survey of corporate profits, regulatory agency reports, and compilations of public company reports.	For some industries in transportation, some in finance, etc., and all in services, judgmental trend, for others in this group, same as annual for 2 most recent years. (Released at time of first revision of GNP for the first, second, and third quarters and of second revision for the fourth quarter.)
	Profits: Rest of the world, before and after tax (\$31.2)	Estimated as part of the balance of payments; see the entry for receipts and payments of factor income, net, under net exports of goods and services	Judgmental trend. ¹ (Released at time of first revision of GNP for the first, second, and third quarters and of second revision for the fourth quarter.)
	IVA (\$6.5)	Obtained as the difference between the NIPA change in business inventories (that is, physical volume of inventories valued in prices of the current period) and the change in the book value of inventories reported by business as described in the entry for change in business inventories.	Same as annual.
	CCAAdj (\$46.0)	The CCAAdj is described under the entry for capital consumption allowances with CCAAdj.	

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Income side (Charges against GNP of \$4,239.9 billion in 1986)—Continued			
Net interest (\$326.1)	Net interest: Domestic monetary (\$128.9)	For farm interest paid and received, Dept. of Agriculture surveys; for residential mortgage interest, mortgage debt from Federal Reserve Board times an interest rate; for all other interest paid and received by business, Internal Revenue Service tabulations of business tax returns or, when these tabulations are not available, interest receipts and payments from regulatory agencies (such as the Federal Deposit Insurance Corporation), from trade sources, or obtained by applying an interest rate to a stock of assets/liabilities from Federal Reserve Board flow of funds accounts	Derived by combining estimates of (1) interest received by persons, (2) government interest paid and received, and (3) interest paid by consumers to business. For (1), judgmental trend; for (2), largely from <i>Monthly Treasury Statement</i> for (3), consumer debt from the Federal Reserve Board times BEA estimates of interest rates. ¹
	Net interest: Rest-of-the world monetary (\$8.1)	Estimated as part of the balance of payments; see the entry for receipts and payments of factor income, net, under net exports of goods and services.	Judgmental trend. ¹
	Net interest: Imputed—life insurance carriers and private noninsured pension plans (\$113.0)	Property income earned (and for life insurance carriers, profits) from Internal Revenue Service tabulations of business tax returns or, for the 2 most recent years, from trade sources.	Judgmental trend.
	Net interest: Imputed—banks, credit agencies, and investment companies (\$76.1)	Property income earned on investment of deposits and monetary interest paid (and for mutual depositories, profits from Internal Revenue Service tabulations of business tax returns when available) from annual reports of regulatory agencies and the Federal Reserve Board. The counterentry to the interest, financial services furnished without payment, is allocated to persons, government, and rest of the world on the basis of deposit liabilities from the same sources	Judgmental trend.
Business transfer payments (\$22.3)		For corporate gifts to nonprofit institutions and bad debts incurred by consumers, Internal Revenue Service tabulations of business tax returns, for other components (such as liability payments for personal injury), information from other government and trade sources.	Judgmental trend.
Indirect business tax and nontax liability (\$347.7)	Federal (\$50.9)	For excise taxes and customs duties, collections from the Internal Revenue Service; for nontaxes (such as fines), receipts from the Office of Management and Budget, <i>Budget of the United States</i> .	For customs duties, the <i>Monthly Treasury Statement</i> ; for other in this group, indicators of activity (such as gasoline production for gasoline tax).
	State and local (\$296.8)	Receipts from Census Bureau quinquennial censuses and annual and quarterly surveys.	Judgmental trend.
Subsidies less current surplus of government enterprises (\$8.7)	Federal (\$23.3)	Outlays and receipts from Treasury Dept. reports; Office of Management and Budget, <i>Budget of the United States</i> ; and reports of various agencies such as the Commodity Credit Corporation.	For subsidies, reports of various agencies and the <i>Monthly Treasury Statement</i> ; for current surplus, agency report for the Commodity Credit Corporation and budget projections for others in this group.
	State and local (—\$14.6)	For subsidies, limited to railroad, judgmental trend, for current surplus, see entry for State and local purchases other than compensation and structures.	Judgmental trend.
Capital consumption allowances with CCAAdj (\$456.7)	Capital consumption allowances (\$477.7)	For depreciation of nonfarm sole proprietorships, partnerships, and corporations, Internal Revenue Service tabulations of business tax returns; for other depreciation (including farms, nonprofit institutions, and owner-occupied houses), perpetual-inventory calculations; for accidental damage to fixed capital, losses reported to insurance companies and government agencies.	Judgmental trend.
	CCAAdj (\$21.0)	Obtained in two parts: First, the part that places a historical-cost series for capital consumed on a consistent basis with regard to service lives and on a straight-line depreciation pattern is the difference between tax return based calculations at historical cost and the perpetual-inventory calculations; second, the part that places the historical-cost series on a current-cost basis is the difference between two perpetual-inventory calculations, one at historical cost and one at current cost.	For capital consumption allowances, judgmental trend as mentioned in preceding item; for current-cost series, perpetual-inventory calculation based on investment and on investment prices.

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Product side (GNP of \$4,235.0 billion in 1986)			
Personal consumption expenditures (\$2,799.8) ²	Durable and nondurable goods: (\$1,341.8)		
	Most goods (goods except subcomponents listed separately) (\$1,090.0)	Benchmark years—Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. Other years—Retail control method, using retail trade sales from Census Bureau annual survey or, for the most recent year, monthly survey of retail trade.	Same as annual for the most recent year.
	New trucks (\$27.6)	Benchmark years—Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. Other years except most recent—Abbreviated commodity-flow method, starting with manufacturers' shipments from Census Bureau annual survey and including an adjustment for exports and imports from Census Bureau merchandise trade. Most recent year—Physical quantity purchased times average retail price: Unit sales and information with which to allocate sales among consumers and other purchasers from trade sources and average price based on a Bureau of Labor Statistics consumer price index.	Same as annual for the most recent year.
	New and used autos (\$135.3)	For new autos, physical quantity purchased times average retail price: Unit sales, information with which to allocate sales among consumers and other purchasers, and average list prices, all from trade sources. For used autos, change in the consumer stock of autos at least 1 year old plus dealers' margins based on unit sales times auction price, all from trade sources.	For new autos, same as annual; for used autos, same as annual except that change in consumer stock is based on judgmental trend.
	Gasoline and oil (\$75.3)	Years except most recent—Physical quantity purchased times average retail price: Gallons consumed from the Dept. of Transportation, information with which to allocate that total among consumers and other purchasers from Federal agencies and trade sources, and monthly average retail price by grade from the Bureau of Labor Statistics. Most recent year—Physical quantity purchased times average retail price: Domestic supply from Energy Information Admin. monthly surveys and price as above.	Same as annual for most recent year.
	Food furnished employees (including military) (\$8.5)	For commercial employees, number of employees of appropriate industries from Bureau of Labor Statistics tabulations times a Bureau of Labor Statistics consumer price index for food; for military personnel, outlays from the <i>Budget of the United States</i> prepared by the Office of Management and Budget.	For commercial employees, same as annual; for military personnel, number of persons in Armed Forces from the Dept. of Defense times a Bureau of Labor Statistics consumer price index for food.
	Expenditures abroad by U.S. residents (\$4.0) less personal remittances in kind to foreigners (\$0.5)	Estimated as part of the balance of payments; see the entry for receipts and payments for other services, net, under net exports of goods and services.	Judgmental trend.

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Product side (GNP of \$4,235.0 billion in 1986)—Continued			
Personal consumption expenditures—Continued	Services: (\$1,450.8)		
	Nonfarm housing—space rent for owner-occupied and rent for tenant-occupied (\$410.5)	Benchmark years—Based on data on housing stock and average annual rental from Census Bureau decennial census of housing and survey of residential finance. Other years—Based on data on housing stock from the Census Bureau biennial housing survey or on the number of households from Census Bureau monthly current population survey and updated average annual rental.	Same method as annual, with housing stock based on annual estimates adjusted for completions from Census Bureau survey and average rent based on annual estimates adjusted using a Bureau of Labor Statistics consumer price index for rent.
	Farm housing—rent (\$9.9)	Dept. of Agriculture survey.	Judgmental trend.
	Auto and other repair, legal and funeral services, barbershops and beauty parlors, nursing homes, laundries, other recreation (except video cassette rentals, cable TV, and lotteries), hotels and motels, and commercial education (\$231.0)	Benchmark years—Receipts from Census Bureau quinquennial census of service industries adjusted for receipts from business and governments. Other years—Receipts, for spectator sports from private organizations, for legitimate theaters from tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics, for others in this group from Census Bureau service annual survey.	For nursing homes, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours; for legitimate theaters, receipts from trade source; for others in this group, judgmental trend.
	Physicians, dentists, and other medical professional services (\$143.7)	Benchmark years—For nonprofit professional services, expenses, for others in this group, receipts, adjusted for government payments and prepayment plans, from Census Bureau quinquennial census of service industries. Other years—Receipts, adjusted for government payments and prepayment plans, from Census Bureau service annual survey.	For nonprofit professional services, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours; for others in this group, judgmental trend.
	Private elementary and secondary schools, welfare activities, and other personal business (\$70.1)	Benchmark years—For schools of religious organizations, enrollment from Dept. of Education times BEA estimate of average expenditures per pupil; for others in this group, receipts from Census Bureau quinquennial census of service industries. Other years—Tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics.	Wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours.
	Financial services furnished without payment by banks, credit agencies, and investment companies ^a (\$70.9)	See entry for net interest: imputed—banks, credit agencies, and investment companies.	Judgmental trend.
	Brokerage, bank service charges, intercity transportation, and private higher education (\$70.9)	For private higher education, expenses, and for others in this group, receipts, all from annual reports of government administrative agencies.	For brokerage, stock exchange transactions from trade sources; for bank service charges, judgmental trend; for intercity transportation, receipts from trade sources; for private higher education, wages and salaries for the industry derived from Bureau of Labor Statistics monthly employment times earnings times hours.
	Domestic services (\$9.7)	Number of workers times weekly hours times earnings from Census Bureau monthly current population survey.	Judgmental trend.

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Product side (GNP of \$1,235.0 billion in 1986)—Continued			
Personal consumption expenditures—Continued	Services—Continued		
	Insurance, hospitals except nursing homes, religious activities, cable TV, utilities, and local transport (\$373.0)	For life insurance, expenses from reports of private organizations or, for the most recent year, tabulations of wages and salaries of employees covered by State unemployment insurance from Bureau of Labor Statistics; for insurance other than life insurance, premiums and benefits from reports of private organizations; for hospitals except nursing homes, expenses from reports of private organizations; for religious activities, expenses based on contributions and membership from private organizations or, for the most recent year, judgmental trend; for cable TV and utilities, receipts from government agencies and trade sources; for local transport, receipts from reports of private organizations	For life insurance and religious activities, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours; for hospitals and electricity, reports from private organizations; for telephone and gas, reports from government agencies; for others in this group, judgmental trend. ¹
	Water and other sanitary services, and lotteries (\$22.9)	Years except 2 most recent—For water and other sanitary services, expenditures from Census Bureau quinquennial censuses and annual surveys of State and local governments, adjusted to a calendar year basis from a fiscal year basis; for lotteries, net receipts from the same source. Two most recent years—Judgmental trend.	Same as 2 most recent years.
	Foreign travel by U.S. residents (\$23.7) less expenditures in the United States by foreigners (\$15.2)	Estimated as part of the balance of payments; see the entry for receipts and payments for other services, net, under net exports of goods and services.	Same as annual.
	Other services: Video cassette rentals and parimutuel net receipts; other housing except hotels and motels; other education and research except commercial education; bridge, etc. tolls; other household operation except repairs and insurance; and clubs and fraternal organizations (\$36.9)	Various source data.	Judgmental trend.
Nonresidential structures (\$137.4)*	Nonfarm buildings (\$90.8)	Value put in place from Census Bureau monthly construction survey.	Same as annual.
	Public utilities: Telephone and telegraph (\$8.2)	Value put in place from Census Bureau monthly construction survey.	Same as annual.
	Public utilities: Other (\$18.0)	Expenditures from Federal regulatory agencies and trade sources.	Anticipated expenditures from BEA plant and equipment survey.
	Mining exploration, shafts, and wells (\$15.8)	Benchmark years—Expenditures from Census Bureau quinquennial census of mineral industries. Other years—For petroleum and natural gas, physical quantity times average price; Footage drilled and cost per foot from trade sources; for other mining, expenditures from BEA plant and equipment survey.	Same as annual for years other than benchmark years.
	Other nonfarm structures (\$2.3)	Value put in place from Census Bureau monthly construction survey.	Same as annual.
	Farm buildings (\$2.0)	Expenditures for new construction from Dept. of Agriculture surveys.	Judgmental trend of value put in place from Census Bureau.

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Product side (GNP of \$4,235.0 billion in 1986)—Continued			
Nonresidential producers' durable equipment (\$299.5)	Equipment except autos (\$278.8)	Benchmark years—Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. Other years—Abbreviated commodity-flow method starting with manufacturers' shipments from the Census Bureau annual survey or, for the most recent year, monthly survey of manufactures and including an adjustment for exports and imports from Census Bureau merchandise trade. For trucks, for the most recent year, physical quantity purchased times average retail price. Unit sales and information with which to allocate sales among business and other purchasers from trade sources and average price based on Bureau of Labor Statistics producer price indexes.	For trucks, see entry for personal consumption expenditures; for others in this group, same as annual for years other than benchmark years except with less detail.
	New and used autos (\$20.7)	For new autos, see entry in personal consumption expenditures; for used autos, change in business stock of autos at least 1 year old from trade source.	For new autos, same as annual; for used autos, judgmental trend.
Residential investment (\$218.3) ^a	Permanent-site single-family housing units (\$102.4)	Value put in place based on phased housing starts and average construction cost from Census Bureau monthly construction surveys.	Same as annual.
	Permanent-site multifamily housing units (\$32.5)	Value put in place from Census Bureau monthly construction survey.	Same as annual.
	Mobile homes (\$5.3)	Benchmark years—See entry for equipment except autos in nonresidential producers' durable equipment. Other years—Physical quantity shipped times price: Shipments from trade sources and average retail price from Census Bureau monthly survey.	Same as annual for years other than benchmark years.
	Additions and alterations, and major replacements (\$54.0)	Expenditures by owner-occupants from Bureau of Labor Statistics quarterly consumer expenditure survey and by landlords from Census Bureau quarterly survey of landlords.	Judgmental trend.
	Brokers' commissions (\$19.5)	Physical quantity times price times average commission rate. Number of one-family houses sold, mean sales price, and commission rates, from Census Bureau monthly construction survey and trade sources.	Same as annual.
Change in business inventories (\$15.7)	Producers' durable equipment (\$5.4)	See entry for most goods under personal consumption expenditures.	Same as annual.
	Manufacturing and trade (\$6.3)	Benchmark years—Book values from Census Bureau quinquennial censuses converted to NIPA basis using information on the proportion of inventories reported with different accounting methods (for example, first-in-first-out), the commodity composition of goods held in inventory, and the turnover period, all from the Census Bureau censuses/surveys of manufacturing and trade, combined with cost of goods held in inventory largely from Bureau of Labor Statistics producer price indexes. Other years—Mainly book values from Census Bureau annual surveys or, for the most recent year, monthly surveys, converted to NIPA basis, as described above.	Same as annual for most recent year.
	Other nonfarm industries (\$10.5)	For petroleum bulk stations in all years—physical quantities times price. Monthly quantities from the Energy Information Admin. times a Bureau of Labor Statistics producer price index. Book values converted to a NIPA basis (except when noted as physical quantity times price), as described for manufacturing and trade. For mining, Internal Revenue Service tabulations of business tax returns or, in the 2 most recent years, Census Bureau quarterly surveys of profits in those years; for services and construction, Internal Revenue Service tabulations of business tax returns or, in the 2 most recent years, judgmental trend; for transportation and electric utilities, Internal Revenue Service tabulations of business tax returns except in the two most recent years, or working capital from the Census Bureau and Federal Reserve Board in the next most recent year, or monthly quantities from the Energy Information Admin. for electric utilities and judgmental trend for transportation in the most recent year.	For electric utilities and for petroleum bulk stations—physical quantities times price. Monthly quantities from Energy Information Admin. times a Bureau of Labor Statistics producer price index; for all others, judgmental trend.
	Farm (—\$1.1)	Physical quantities times current prices, from Dept. of Agriculture surveys.	Judgmental projection by BEA and Dept. of Agriculture.

See footnotes at end of table.



Table 2.—Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GNP—Continued

Component (billions of dollars)	Subcomponent (billions of dollars)	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Preliminary quarterly estimates: Source data and methods used to prepare an extrapolator
Product side (GNP of \$4,235.0 billion in 1986)—Continued			
Net exports of goods and services (\$-105.5)	Merchandise exports and imports, net (\$-142.6)	Estimated as part of the balance of payments: Import and export documents compiled monthly by the Census Bureau with adjustments by BEA for coverage and valuation to put them on a balance-of-payments basis and then on a NIPA basis	Same as annual.
	Receipts and payments of factor income, net (\$33.7)	Estimated as part of the balance of payments: For direct investment income, BEA surveys of U.S. companies with affiliates abroad and of U.S. affiliates of foreign companies; for other income, holdings or transactions from Treasury Dept. surveys ⁵ times appropriate yields or interest rates and reports by U.S. Government agencies of interest receipts—all adjusted to NIPA basis.	Judgmental trend. ¹
	Receipts and payments for other services, net (\$3.4)	Estimated as part of the balance of payments: For government transactions, reports by Federal agencies on their purchases and sales abroad; for most others in this group (including travel, passenger fares, other transportation, royalties and license fees, and private remittances), BEA quarterly or annual surveys (supplemented with data from other sources)—all adjusted to NIPA basis. Also includes financial services furnished without payment; see entry for net interest: imputed—banks, credit agencies, and investment companies.	Same as annual.
Government purchases of goods and services (\$669.7)	Federal (\$366.2)	Outlays from the <i>Budget of the United States</i> prepared by the Office of Management and Budget, the <i>United States Government Annual Report: Appendix</i> prepared by the Treasury Dept., and annual reports of selected agencies (such as the Commodity Credit Corporation), all adjusted to a delivery timing basis, to exclude financial transactions and transactions in kind, and to exclude interest, subsidies, net expenditures of government enterprises, transfer payments, and grants-in-aid. Also includes financial services furnished without payment; see entry for net interest: imputed—banks, credit agencies, and investment companies.	Same procedures as annual but using outlays from the <i>Monthly Treasury Statement</i> and monthly reports of selected agencies.
	State and local compensation (\$299.9)	Mainly tabulations of wages and salaries of employees covered by State unemployment insurance from Bureau of Labor Statistics and contributions from the Social Security Admin., other agencies administering social insurance programs, and Census Bureau surveys of State and local government retirement funds.	Judgmental trend.
	State and local structures (\$61.4)	For highways, for years except the most recent, expenditures from the Dept. of Transportation or, for the most recent year, construction put in place from Census Bureau surveys; for other categories, value of construction put in place from Census Bureau monthly construction surveys	Value put in place from Census Bureau monthly construction surveys.
	State and local other than compensation and structures (\$142.2)	Years except the 2 most recent—Expenditures from Census Bureau quinquennial censuses and annual surveys of these governments, adjusted to a calendar year basis from a fiscal year basis and adjusted for exclusions and inclusions in a manner similar to that for Federal purchases. Also includes financial services furnished without payment; see entry for net interest: imputed—banks, credit agencies, and investment companies. Two most recent years—Judgmental trend.	Same as annual for 2 most recent years.

1. For insurance other than life insurance, profits and interest from the rest of the world, and parts of domestic net interest, data become available to replace the judgmental trend at the time of the second revision.

2. Includes \$1.8 billion for food produced and consumed on farms, standard clothing issued to military personnel, and used trucks.

3. Also referred to as services furnished without payment by financial intermediaries except life insurance carriers and private nonprofit pension plans.

4. Includes \$0.1 billion for brokers' commissions on sale of structures and net purchases of used structures.

5. Includes \$9.6 billion for other structures (dormitories, fraternity and sorority houses, nurses' homes, etc.) and net purchases of used structures.

CYAdj: Capital consumption adjustment

IYA: Inventory valuation adjustment

NIPA: National income and product account

Source: 1986 estimates—Survey of Current Business, July 1987.



other methods are described more fully in the next section.

When value data are not used in preparing an estimate, the table indicates the combination of data with separate quantity and price dimensions that is used to derive the required value estimate (as well as indicating any major adjustments needed to derive estimates consistent with NIPA definitions and coverage). On the product side, a "physical quantity times price" method is used for several components. For example, the estimate for new autos is prepared as unit sales times average list price. Both the income and product sides refer to an "employment times hours times average hourly earnings" method and to several forms of a "stock of assets/liabilities times an interest rate" method.

As mentioned earlier, some of the source data shown in table 2 for the annual estimate are used to interpolate and extrapolate the levels established by source data that are viewed as final, and all of the source data shown for the preliminary quarterly estimates are used to extrapolate the level of the preceding quarter. In addition to using indicator series, as is the case when source data are listed in the table, extrapolation and interpolation may use trends, as is the case when "judgmental trend" is listed in the table.

Extrapolation is a method of extending estimates from one period forward (or backward) in time to other periods. In simple terms, extrapolation applies a percent change—either the percent change in the indicator series or the percent change in the trend—to the level of the preceding period. Interpolation is a method of

filling in estimates between two periods. Interpolation applies a more complex mathematical formula—there are several in use—to preserve the pattern of the indicator series consistent with the level of the source data viewed as final. (An explanation of interpolation and extrapolation, using simple numerical examples, in the context of BEA's regional estimates is in [22], pp. T-3 and T-35.)

Illustrative methods.—Table 2 refers to three methods—commodity flow, retail control, and perpetual inventory—used for specific components. The methods are described briefly in the following paragraphs to illustrate the work of conforming source data to the concepts and definitions of the NIPA's and filling in gaps in data coverage.

The *commodity-flow method* was originally developed in the 1930's as a way to obtain the value of consumers' purchases of goods (that is, commodities) or of producers' purchases of durable equipment. A generalization of that method is now applied for the components within the input-output framework that is used to establish GNP in benchmark years. The steps and information used in benchmark years for producers of durable equipment except autos and scrap are summarized in the tabulation.

The commodity-flow method is also used for producers' durable equipment in nonbenchmark years, but it is implemented in an abbreviated form. It uses less commodity detail—starting with shipments for about 30 commodity classes from the Census Bureau annual survey of manufactures—and assumes the same distrib-

Seasonal Adjustment, Annual Rates, and Base Years

The quarterly estimates in both current and constant dollars are usually presented as seasonally adjusted annual rates, and quarterly price indexes and implicit price deflators are presented as seasonally adjusted indexes. Typically, the source data are seasonally adjusted to remove the variations—due to events such as weather, holidays, and tax payment dates—that normally occur at about the same time and in about the same magnitude each year. After seasonal adjustment, cyclical and other short-term changes in the economy stand out more clearly. The seasonal adjustments—made using methods such as the widely used Census Bureau X-11 ratio-to-moving-average method—reflect historical experience. The years on which this experience is based are continually moved forward, and new seasonal adjustments are introduced at the time of annual (and comprehensive) revisions. (The full set of NIPA tables, as presented in annual and comprehensive revisions, includes six seasonally unadjusted quarterly series: GNP, personal consumption expenditures, Federal receipts and expenditures, State and local receipts and expenditures, foreign transactions, and corporate profits with inventory valuation adjustment.)

Annual rates are the result of putting values for a quarter or a month at their annual equivalent; that is, they are the value that would be registered if the rate of activity were

maintained for a full year. For example, if 2 million cars were sold in a quarter, the annual rate of sales would be 8 million. Annual rates make it easier to compare values for time periods of different lengths: The 8 million annual rate of sales for a quarter is easily compared with the sales of, say, the preceding year.

Percent changes from one quarter to the next are usually presented as annual rates of change; that is, they are the rates of change that would be registered if continued—or more specifically, compounded—for a full year. For example, if the rate of change from one quarter to the next were 2 percent, the annual rate of change would be 8.2 percent. (The 8.2 percent is more than four times the 2 percent because of the compounding; it is calculated as $(1.02)^4$.)

Constant-dollar estimates are expressed in terms of the prices of what is referred to as the "base" (or "valuation") period. Periodically, the base year is shifted forward so that the base-year prices are more representative of recent economic activity. The base year was shifted from 1972 to 1982 at the time of the comprehensive revision released in 1985. (Thus, tables of constant-dollar estimates at present bear the headline "billions of 1982 dollars.") Correspondingly, price indexes and implicit price deflators are set equal to 100 in 1982.



tion in steps 3-6 as in the last benchmark. (See [10] for a description of the method as applied to computers.) An even more abbreviated commodity-flow method is used for current quarterly estimates.

The strength of the commodity-flow method is that it draws on the very detailed commodity classification

Commodity-Flow Method

Step	Information used
1. Identify manufacturers' shipments of equipment.	Three criteria are used to identify commodity classes that may contain capital equipment: (1) The commodity must have a life of more than 1 year, (2) it must not be treated as an integral part of a structure, and (3) it must include a commodity that, if purchased by a business, would be charged to a capital account under normal accounting procedures. About 800 commodity classes are identified as solely or partly equipment. Shipments are from the Census Bureau quinquennial census of manufactures.
2. Add imports and subtract exports of equipment.	Exports and imports are from Census Bureau merchandise trade.
3. Subtract change in trade inventories (mainly wholesale) of equipment.	The change in inventories is from the Census Bureau quinquennial censuses of wholesale and retail trade.
4. Subtract intermediate purchases (that is, business current-account purchases), purchases by persons, and purchases by governments.	Intermediate purchases are primarily from the Census Bureau quinquennial census of manufactures; purchases by persons are based on a variety of public and private data sources; purchases by government are from the Census Bureau quinquennial census of governments for State and local government and the Census Bureau annual survey of shipments to the Federal Government.
5. Add trade and transportation margins.	Trade margins are from the Census Bureau quinquennial census of wholesale and retail trade adjusted to a commodity basis; transportation margins are from tabulations of reports to the Interstate Commerce Commission and the Dept. of Transportation.
6. Add the margin on used equipment and adjust for intersector sales to obtain producers' durable equipment.	Margins on used equipment are from the same sources as margins in step 5. For intersector sales and purchases by business, sales to persons are based on the Census Bureau quinquennial censuses of retail trade and transportation; purchases from the Federal Government are based on Treasury Dept. and General Services Admin. reports, and purchases from State and local governments are based on the Census Bureau quinquennial censuses of governments; and purchases from and sales to foreigners are from Census Bureau merchandise trade.

and comprehensive coverage of the census of manufactures for benchmark years. To go from domestic manufacturer's shipments to business purchases, it relies on data drawn from several other comprehensive, but not necessarily consistent, sets of source data. As applied in its abbreviated form, when the data for steps 3-6 are not available, the method relies on the assumption that the relationships do not change rapidly. The assumption that, for each type of equipment, the share of the total going to intermediate purchases, persons, and governments is stable between benchmark years is an important limitation.

The *retail-control method*, which is used to estimate over one-third of the value of personal consumption expenditures, is more direct than the commodity-flow method. The method provides, first, the indicator series used in extrapolating and interpolating the total of most goods and, second, provides the "control" total to which type-of-good components in this group are made to sum. Specifically, it is used to prepare estimates for all goods except motor vehicles, gasoline and oil, food furnished employees, expenditures abroad by U.S. residents, and personal remittances in kind to foreigners, each of which is shown separately in table 2 (and the very small amounts of food produced and consumed on farms and standard clothing issued to military personnel, which are not shown separately). The steps and information used for each current month's estimate are explained in the tabulation. For current quarters, the monthly estimates are summed to quarterly estimates. The same steps are used with comparable information for annual estimates except in benchmark years.

The retail-control method makes it possible to use retail sales, available only by kind of business except at 5-year intervals, to provide type-of-good detail. Further, its feasibility on a monthly basis is the foundation for the monthly estimates of personal consumption expenditures. These monthly estimates, in combination with monthly estimates of personal income, provide timely information for the analysis of the economic activities of one of the major sectors in the economy. The basic limitation of the method as an extrapolator is that it cannot take into account changes in the relative importance of business purchases at retail stores, services sold at retail stores, or personal purchases outside of retail stores. In addition, use of the method to provide the control to which components sum relies on the general assumption that the types of goods purchased in the various kinds of retail stores do not change rapidly.

The *perpetual-inventory method* is used to derive estimates of fixed capital stock. The stock estimates, in turn, form the basis for the estimates of capital consumption allowances with capital consumption adjust-



Retail-Control Method

Step	Information used
For the expenditures total:	
1. Derive total sales (including sales taxes) for retail establishments for which most of their sales are consumer-type products not estimated separately. This total, called the retail control, is the sum of:	
a. Total retail sales of establishments other than those operated by the military less sales of building materials stores, hardware stores, garden dealers (because their sales relate mainly to homeownership items, which are not included in PCE) and of motor vehicle dealers and gasoline service stations (because related expenditures are estimated independently).	Monthly sales by kind of business (grocery stores, drug stores, and household appliance stores, etc.) are from the Census Bureau monthly survey of retail trade.
b. Sales taxes.....	Monthly sales taxes are based on tax rates, derived from Census Bureau quarterly surveys of State and local tax collections distributed by industry by BEA and retail sales from the Census Bureau annual survey of retail trade, applied (by kind of business) to retail sales in step 1a.
c. Sales of retail establishments operated by the military.	Monthly sales from the Department of Defense, covering commissaries and post exchanges.
2. Extrapolate the last monthly estimate by the retail control	
For PCE type-of-good categories:	
3. Derive an extrapolation index for each PCE category by weighting sales for each kind of business by the percentage of total sales of a PCE category accounted for by that kind of business and summing over all kinds of business.	Percentages used as kind-of-business weights are based on merchandise line sales (groceries and other foods, drugs, major household appliances, etc.) from the Census Bureau quinquennial census of retail trade.
4. Extrapolate the last monthly estimate for each PCE category by the extrapolation index to obtain a preliminary estimate for the category.	
5. Substitute independently prepared estimates of tobacco products, boats, and personal aircraft (because they are thought to be more reliable than an estimate prepared by allocation).	
6. Sum the estimates of the PCE categories to obtain a total.	
7. Adjust the estimates for the PCE categories other than the independently prepared estimates so that their total plus the independently prepared estimates equals the retail control derived in step 2.	

PCE Personal consumption expenditures.

ment (often referred to as "economic" depreciation) and for the estimates of the capital consumption adjustment shown with proprietors' income, rental income of persons, and corporate profits. The perpetual-inventory method is based on cumulating past investment flows and deducting the value of discarded assets; it is an alternative to direct measurement of the capital stock, which is seldom statistically feasible on a comprehensive basis. The steps and information used in preparing BEA's estimates of the capital stock are summarized in the tabulation.

One of the main advantages of obtaining the stock estimates in this way is that, for the most part, comprehensive, detailed, and relatively reliable estimates of investment flows—with which the method starts—are available within the NIPA's. By using these flows, the resulting stock and depreciation estimates are consistent conceptually and statistically with the NIPA's. In addition, the perpetual-inventory method provides alternative valuations of the capital stock—at historical cost (that is, when an asset is valued at the price at which it was purchased new), at constant cost (that is, when an asset is valued at the price that would have been paid for it had it been purchased in the base period), and at current cost (that is, when an asset is valued at the price that would have been paid for it had it been purchased in the period to which the stock estimates refer). One of the disadvantages of this method is that it relies on information on the service lives of various kinds of assets; accurate and up-to-date information of this kind is difficult to obtain.

Observations.—Although the main purpose of the sources and methods table is to provide a convenient reference, the overview it provides serves as the basis for several broad observations about methodology.

First, on the product side, separate methodologies are often shown for benchmark and other years. On the income side, the distinction between benchmark and other years seldom appears. For many income-side components, the same methodology is used each year. However, for several—notably corporate profits and net interest—the final source data do not become available for several years so that interim methodologies must be used until the final one can be substituted.

Second, product-side estimates are largely based on nonadministrative data. Census Bureau censuses and surveys dominate; for the annual estimates, they account for about two-thirds of the product-side total. Income-side estimates are largely based on administrative data. Tabulations from the unemployment insurance program and from business income tax returns dominate; for the annual estimates, they account for about two-thirds of the income-side total.

Third, the product-side estimates provide detail by type of good or service. Identifying each sector's purchases is fundamental to the structure of the national income and product account, and that requirement dictates the use of source data—notably manufacturers' shipments as used in the commodity-flow method—that also provides detail for many components. (Also, as indicated in the next section, detail is crucial to the preparation of constant-dollar estimates.) The income-side estimates provide detail by industry, by legal form of organization (for example, corporate and noncorporate business), or both.

Finally, the estimates of personal consumption expenditures provide an interesting contrast between the methods of deriving totals and component detail.

Perpetual-Inventory Method

Step	Information used
1. Assemble investment flows (supplemented by transfers of used assets) in asset/industry/legal form detail going back far enough in time to account for the stock at a starting date.	Investment flows at the all-industry level for 1929 and later are the NIPA fixed investment series, and those for earlier years are based on a variety of public and private sources.
2. Deflate flows to obtain constant-dollar estimates.	Price indexes are those used to derive the constant-dollar NIPA fixed investment series: For structures, they are based on various price and cost indexes; for equipment, based on producer price indexes from the Bureau of Labor Statistics; a price index for aircraft from the Dept. of Transportation; a price index for ships from the Maritime Admin., and the BEA computer price index.
3. Cumulate the value of the constant-dollar investment flows.	
4. Associate a "life" (that is, the length of time between the investment and when the asset is normally retired from the stock) with each asset type in the NIPA fixed investment series to estimate the value of retirements.	Average service lives are from industry studies in the 1970's by the Treasury Dept., modifications of "Bulletin F" (1942 ed.) of the Treasury Dept., book value data compiled by regulatory agencies, Dept. of Agriculture data, and trade association data. Distributions of retirements around the average service life are based on a bell-shaped distribution centered on the average (for example, retirements start at 5 percent of the average life and end at 95 percent for residential structures).
5. Cumulate the value of retirements and subtract these cumulative values from the cumulative value of investment; the result is gross stock at constant cost.	
6. Calculate the part of each investment flow that is consumed each year.	Straight-line depreciation is applied to the investment flows over their service lives.
7. Cumulate the value of depreciation and subtract the cumulative value from the gross stock; the result is the net stock at constant cost.	
8. Reflate constant-cost stocks to current cost.	The price indexes are those used in step 2.

When the retail-control method is used, the total of expenditures for goods prepared in that way is estimated with more certainty than is the component detail, which is derived by allocating the total using percentages determined at 5-year intervals. In contrast, the total of expenditures on services is pieced together from component detail. The estimating procedure is simpler in that the consumer of a service often purchases it directly from the producer and many types of services—haircuts, for example—are purchased only by persons. However, any uncertainty about the source data that provide the detail carries through to the total of expenditures for services.

Constant-dollar estimates and associated price indexes

The principle underlying constant-dollar estimates is simple: Value each component at its price in a base period. (See the box on page 16 for more about the base period.) This approach, rather than the approach of adding the various physical quantities (the approach perhaps suggested by the term "real" that is often used in referring to constant-dollar estimates), is taken because "you can't add apples and oranges." Constant-dollar values provide the means of aggregation.

This principle is implemented for the product-side components of GNP by one of three methods, depending on the availability of source data. The method used for by far the largest part of GNP is deflation. In fact, deflation is so widely used that the term is often used to describe the preparation of all constant-dollar estimates. In deflation, constant-dollar estimates are obtained by dividing the most detailed current-dollar components by appropriate price indexes with the base period—at present, the year 1982—equal to 100.

The other methods, quantity extrapolation and direct base-year valuation, are similar in that they both use quantity data. For quantity extrapolation, constant-dollar estimates are obtained by extrapolating the current-dollar estimates from the base year to the current period by quantity data. For direct valuation, constant-dollar estimates are obtained by multiplying base-year prices by quantity data for the current period.

In preparing constant-dollar estimates, detail is crucial because the greater the detail the more closely the results approximate the ideal of pricing each good or service purchased in the current period with its base-year price. A number of the improvements in methodology for the constant-dollar estimates have focused on carrying out the calculations at a more detailed level. For example, until the mid-1970's, expenditures on food consumed at home had been deflated by the index for food at home from the Consumer Price Index, in which



food prices are weighted by the composition of expenditures in a base period. The improvement was to disaggregate these expenditures and deflate 16 separate categories with the appropriate component of the index. Thus, if there are shifts in expenditures between the base year and the current year—for example, from meats to vegetables—the more detailed deflation captures the shifts and provides a more accurate measure of changes in constant-dollar expenditures on food. At present, roughly 600 categories of goods and services are deflated separately for the quarterly and regular annual estimates.

Table 3 summarizes the methodology for the preparation of constant-dollar estimates of GNP and its product-side components, showing which of the three methods is used and indicating the source data with which it is implemented.³ The subcomponents are as shown in table 2, except where more detail is needed to highlight differences in methodology for constant-dollar estimates. For example, more detail is provided for Federal purchases because distinctly different source data are used for the deflation of national defense and nondefense purchases. For this table, the distinction between annual and quarterly methodology is far less important than it was for the current-dollar methodology, and major differences between the annual and quarterly source data are noted within the individual entries.

Table 3 shows that components of the Consumer Price Index and the Producer Price Index, prepared monthly by the Bureau of Labor Statistics, are used to deflate many components, which together account

for well over three-fourths of GNP. Other indexes used in deflation are mainly for services (indexes of earnings and expense), structures (various cost indexes and a Census Bureau index for new houses), merchandise exports and imports (Bureau of Labor Statistics and Census Bureau indexes), and national defense (primarily BEA indexes). Quantity extrapolation is used for a few service subcomponents in personal consumption expenditures, mining shafts and wells, imputed interest and financial service charges, and compensation of employees in government purchases. Direct valuation of quantities is used for used autos and inventories of agricultural commodities held by farmers and the Federal Government.

The implicit price deflator and price indexes

The preparation of current- and constant-dollar estimates yields a byproduct—the implicit price deflator. It is derived as a current-dollar measure divided by a constant-dollar measure, multiplied by 100. Technically, the implicit price deflator for GNP or a component of GNP is an average of the indexes of prices of all the goods and services that make up GNP or the component, weighted by the constant-dollar composition of GNP or the component in the current period. Thus, changes in the implicit price deflator reflect not only changes in prices but also any shift in the composition of GNP or the component.

A fixed-weighted price index also is an average of the indexes of prices of all the goods and services that make up GNP or the component. In contrast to the implicit price deflator, the index is weighted by the composition of GNP or the component at a fixed point selected as the base period. Such indexes measure the changes in the price of a fixed market basket; thus, they measure only price change. Chain price indexes, from one period to the next, also do not reflect shifts in the composition. In the 1970's, it became especially useful to distinguish quarter-to-quarter shifts in the composition of GNP from price changes because at times each was large. Since then, BEA has increasingly featured the GNP fixed-weighted and chain price indexes as appropriate measures of price change.

³With few exceptions, BEA does not prepare constant-dollar estimates of income measures because price indexes cannot be associated with them, as they can with product measures. Two exceptions are disposable personal income and the profits measures presented in BEA's *Business Conditions Digest*. In both cases, the series are adjusted for price change by reference to prices of the goods and services on which the income is spent. BEA prepares constant-dollar net national product and national income by preparing constant-dollar estimates of capital consumption allowances with capital consumption adjustment and of the non-factor charges and then subtracting them from constant-dollar GNP.



Table 3.—Principal Source Data and Estimating Methods Used in Preparing Constant-Dollar Estimates of GNP

Component	Subcomponent	Deflation, using price based on—		Using quantity for—	
		Components of the Consumer Price Index (CPI) or the Producer Price Index (PPI)	Other	Extrapolation	Direct valuation
Personal consumption expenditures	Most goods (goods except subcomponents listed separately)	Except as noted, CPI, military clothing, PPI	Computers, BEA price index		Used autos in two parts (1) Margin, unit sales from trade source; (2) change in stock, based on unit sales and BEA constant-dollar value
	New trucks	CPI			
	New and used autos	New autos, CPI			
	Gasoline and oil	CPI			
	Food furnished employees (including military)	CPI			
	Expenditures abroad by U.S. residents less personal remittances in kind to foreigners		Foreign consumer price indexes (exchange-rate adjusted)		
	Nonfarm housing—space rent and rent	CPI			
	Farm housing—rent			BEA net stock of farm dwellings based on Dept. of Agriculture data	
	Auto and other repair, legal and funeral services, barbershops and beauty parlors, nursing homes, laundries, other recreation (except video cassette rentals, cable TV, and lotteries), hotels and motels, and commercial education	CPI			
	Physicians, dentists, and other medical professional services	CPI			
	Private elementary and secondary schools, welfare activities, and other personal business	Personal business, CPI	Schools and welfare activities, BEA earnings and expense index		
	Financial services furnished without payment by banks, credit agencies, and investment companies ¹			Paid employee hours of relevant financial institutions	
	Brokerage, bank service charges, intercity transportation, and private higher education	Except as noted, CPI	Airline transportation, BEA index based on revenue passenger miles from Dept. of Transportation averaged with consumer price index component; higher education, BEA earnings and expense index	Brokerage, BEA orders derived from volume data from Securities and Exchange Commission or trade source	
	Domestic services	CPI			
	Insurance, hospitals except nursing homes, religious activities, cable TV, utilities, and local transport	Except as noted, CPI	Life insurance and religious activities, BEA earnings and expense index, nonprofit hospitals, input price index from Health Care Financing Admin.	Auto insurance, deflated premiums, health insurance, deflated benefits	
	Water and other sanitary services, and lotteries	CPI			
	Foreign travel by U.S. residents less expenditures in the United States by foreigners	Expenditures in the United States, CPI	Foreign travel, foreign consumer price indexes (exchange-rate adjusted)		
	Other services: Video cassette rentals, other housing except hotels and motels, other education and research except commercial education; bridge, etc. tolls; other household operation except repairs and maintenance; and clubs and fraternal organizations	Except as noted, CPI	Other education and research, and clubs and fraternal organizations, BEA earnings and expense index, bridge, etc. tolls, BEA index based on trade source data	Patrimony net receipts, deflated winnings	
Nonresidential structures	Nonfarm buildings		Cost index from trade source and price of new houses from Census Bureau		
	Public utilities	Gas and petroleum pipelines, PPI	Telephone and telegraph, cost index from trade source, other, cost indexes from government agencies and trade sources		
	Mining exploration, shafts, and wells	Casing, PPI	Exploration, cost index from trade source, mines, implicit price deflator for nonfarm nonresidential buildings	Footage by type from trade source	
	Other nonfarm structures		Cost indexes from government agencies		
	Farm buildings		Cost index from trade source and price of new houses from Census Bureau		
Nonresidential producers' durable equipment	Equipment except autos	Except as noted, PPI	Aircraft, annually, index from Dept. of Transportation; ships, annually, index from Maritime Admin.; computers, BEA price index		Used autos in two parts (1) Margin, unit sales from trade source; (2) change in stock based on unit sales and BEA constant-dollar value
	New and used autos	New autos, CPI			



Table 3.—Principal Source Data and Estimating Methods Used in Preparing Constant-Dollar Estimates of GNP—Continued

Component	Subcomponent	Deflation, using price based on—		Using quantity for—	
		Components of the Consumer Price Index (CPI) or the Producer Price Index (PPI)	Other	Extrapolation	Direct valuation
Residential investment	Permanent site housing units		Price of new houses from Census Bureau		
	Additions and alterations, and major replacements	CPI			
	Brokers' commissions		Price of new houses from Census Bureau		
	Producers' durable equipment	PPI			
Change in business inventories	Mobile homes	PPI			
	Nonfarm: Purchased goods, all industries	Except as noted, PPI	Crude petroleum, index from Energy Information Admin		
	Nonfarm: Work in process and finished goods, manufacturing	Except as noted, PPI; some overhead cost items, CPI	BEA unit labor cost		
	Farm				Dept. of Agriculture quantities by crop
Net exports of goods and services ¹	Merchandise exports and imports, net ²		Bureau of Labor Statistics export and import price indexes ³ ; Census Bureau monthly unit value indexes; implicit price deflators (including, for computers, BEA price index) and gold price from trade source		
	Receipts and payments of factor income, net ²		Except as noted, implicit price deflator for net domestic product	Imputed interest paid to foreigners, paid employee hours of relevant institutions	
	Receipts and payments for other services, net ²	Travel receipts, CPI; railroad freight, PPI	Military transfers and direct defense expenditures abroad; selected implicit price deflators for national defense purchases (see below): travel payments and U.S. Government payments for miscellaneous services, foreign consumer price indexes (exchange rate adjusted), royalties and fees, and other private services, implicit price deflator for gross domestic product	Financial services furnished without payment ⁴ ; paid employee hours of relevant financial institutions, several parts of freight and port expenditures, relevant tonnage	
Government purchases of goods and services	Federal: National defense compensation			Full-time equivalent employment by rank	
	Federal: National defense other than compensation	Travel, rent, and utilities, CPI	Goods and services except as noted and military structures, BEA indexes based on Dept. of Defense prices paid, computers, BEA price index, nonmilitary structures, cost indexes from trade sources		
	Federal: Nondefense compensation			Full-time equivalent employment by grade	
	Federal: Nondefense other than compensation	Most goods, PPI; travel, rent, and utilities, CPI	Structures, cost index from trade source; computers, BEA price index; services except as noted, BEA earnings and expense index	Financial services furnished without payment ⁴ ; paid employee hours of relevant financial institutions	Commodity Credit Corporation purchases, Dept. of Agriculture quantities by crop
	State and local compensation			For employees in education, full-time equivalent employment by education and experience; for other employees, full-time equivalent employment	
	State and local other than compensation and structures	Services except as noted and goods used in maintenance and repair, CPI; goods except as noted and electricity, PPI	Cost indexes from trade sources and government agencies	Financial services furnished without payment ⁴ ; paid hours of relevant financial institutions	

1. Also referred to as services furnished without payment by financial intermediaries except life insurance carriers and private noninsured pension plans

2. Entries are representative, for full detail, see table 9, SURVEY OF CURRENT BUSINESS, November 1986, pp. 35-36

3. Constant-dollar estimates of exports and imports (or receipts and payments) are prepared separately

4. For the first and second revisions of the quarterly estimates, the export and import price indexes, which are for the third month of the quarter, are interpolated to obtain quarterly averages. For the preliminary estimate, 1 month of the Census Bureau unit value indexes is used



Part II.

A Directory to Information About GNP

IN recent years, a number of BEA publications have provided information about GNP and its income and product components. The following is an annotated list of those publications, numbered with the most recent publication first and going back to the mid-1970's. Among the items listed are the methodology papers mentioned earlier and articles describing the comprehensive and annual revisions. The methodology papers explain the conceptual framework of the NIPA's and the source data and estimating methods used to prepare the estimates. One of the papers provides an introduction to national economic accounting; it is listed as item 18. Two others, on foreign transactions and corporate profits, have been published; they are listed as items 4 and 16, respectively. During the period covered by the list, comprehensive revisions were released in 1985, 1980, and 1976; the articles describing them are listed as items 14, 35, and 48. Annual revisions were released in most years (except before or after comprehensive revisions); the articles describing them are listed as items 2, 8, 20, 25, 30, 38, 42, 44, 46, and 54. A number of the other publications in the list, although more general or less directly related, contain useful information about GNP and its components. These include publications about reliability of the estimates (items 1 and 11), capital stock (items 3 and 15), regional income estimates (item 22), and the underground economy (items 19 and 21).

Table 4 is designed to serve as a directory to the information in these publications. For GNP and several other measures of production and for each income and product component, the first two columns indicate the publications that have included descriptions of methodology and the second two columns indicate publications that have discussed changes in definition and classification and changes in methodology. The publications about the methodology for constant-dollar estimates or about price measurement are marked with an asterisk. The items indicated for the production measures tend to be overviews; those for components, more specific.

1. "Evaluation of the GNP Estimates." August 1987 SURVEY. Reviews the accuracy and reliability of quarterly GNP estimates and recommendations for improvements in source data. Draws on several BEA studies as well as on recent studies by university researchers.

2. "The U.S. National Income and Product Accounts: Revised Estimates, 1984-86, and First and Second Quarters 1987." July 1987 SURVEY. Presents a regular annual revision. Describes methodological changes affecting personal consumption expenditures (different source data for quarterly estimates of gasoline, first-time estimates of video cassette rentals, and, for current-dollar estimates, an adjustment for quality change in used car purchases); producers' durable equipment (more detailed treatment of exports and imports in the abbreviated commodity-flow method and, for current-dollar estimates, an adjustment for quality change in used car transactions); net exports (added coverage of commissions on securities transactions and of medical services); and deflation procedures. The changes in deflation procedures affected personal consumption expenditures (a different price index for new trucks); residential investment (a modification of the price index for new houses); and personal consumption expenditures, producers' durable equipment, net exports, and government purchases (inclusion of prices for personal computers).

3. *Fixed Reproducible Tangible Wealth in the United States, 1925-85*. 1987 (GPO Stock No. 003-010-00177-1, price \$18.00). Includes a detailed description of the investment flows used to implement the perpetual-inventory method of preparing the capital stock estimates and of the derivation of the associated estimates of depreciation. Also describes the recently developed estimates of fixed private capital by industry.

4. *Foreign Transactions in the National Income and Product Accounts*. BEA Methodology Paper Series MP-3, 1987 (GPO Stock No. 003-010-00178-0, price \$2.75). Describes the concepts, sources, and methods



Table 4.—Directory to Information about GNP

[Numbers refer to items in the list of publications; asterisk refers to methodology for constant-dollar estimates]

	Description of methodology		Changes in:		Other
	General	Subcomponents or specific aspects	Definitions and classifications ^a	Methodology	
Charges against GNP	1 (incl.*)	5			7; 18; 19
Compensation of employees:					
Wages and salaries		4 (rest of the world); 6 (rest of the world); 22 (disbursements); 37 (disbursements); 45		21; 30 (State and local)	
Supplements to wages and salaries		22 (other labor income); 37 (other labor income); 45	14 (employer contributions); 48	42 (other labor income, employer contributions)	
Proprietors' income with IVA and CCA _{dj}	22; 25; 37	40 (farm)		8 (farm); 20 (farm); 21 (nonfarm); 35	
Rental income of persons with CCA _{dj}	22; 25; 37			14; 20; 21; 30	
Corporate profits with IVA and CCA _{dj}	16	4 (rest of the world); 6 (rest of the world); 22 (dividends); 23 (financial); 29 (reinvested earnings); 37 (dividends)	35 (rest of the world)	8; 35	
Net interest	8; 20; 25	4 (rest of the world); 6 (rest of the world); 8 (personal interest income); 20 (personal interest income); 22 (personal interest income); 25 (personal interest income); 33 (personal interest income); 37 (personal interest income)		25 (rest of the world); 30 (rest of the world); 35	
National income	48*; 52				
Business transfer payments	22; 37			48*	
Indirect business tax and nontax liability				8 (State and local); 48*	
Subsidies less current surplus of government enterprises				48*	
Capital consumption allowances with CCA _{dj}	3; 15; 50			14	
Statistical discrepancy				35*	

CCA_{dj} Capital consumption adjustment.

IVA Inventory valuation adjustment.

1. For items that were reclassified from one component to another, only the latter component is noted on the table. For example, the reclassification of medical vendor payments from government purchases to personal consumption expenditures, an entry is made for personal consumption expenditures but not for government purchases.



Table 4.—Directory to Information about GNP

[Numbers refer to items in the list of publications; asterisk refers to methodology for constant-dollar estimates]

	Description of methodology		Changes in:		Other
	General	Subcomponents or specific aspects	Definitions and classifications ¹	Methodology	
GNP	1 (incl.*); 17*; 52 (incl.*)	5 .....	.....	14 (base-year*); 48 (base-year*)	7 (incl.*); 11; 18; 19; 41 (incl.*)
Personal consumption expenditures	37 (incl.*)	3 (durables, incl.*); 8 (services); 26 (rent, imputed financial services); 43*; 49 (vehicles)	14 (medical vendor payments, energy and crime victim assistance), 48 (border workers, workers compensation)	2 (several changes, incl. trucks*, computers*); 8 (airline travel*, computers*); 20 (space rent*); 21; 30 (gasoline, space rent); 35 (hospital*); 42 (auto repairs, brokerage*, food*); 48 (food*, financial services*)	
Gross private domestic investment:					
Fixed investment:					
Nonresidential:					
Structures	3 (incl.*); 15 (incl.*); 53*	.....	14 (railroad track); 35 (hotels and motels); 48 (mineshafte)	14*; 21; 44*	
Producers' durable equipment	3 (incl.*); 15 (incl.*); 51*	10 (computers*); 49 (vehicles) .....	.....	2 (several changes, incl. computers*); 8*; 12; 21; 35; 44*; 48 (several changes); 51*	
Residential	3 (incl.*); 15 (incl.*); 53*	.....	14 (major replacements); 48 (mobile homes, landlords' durables)	2 (new houses*); 14 (additions and alterations*); 21; 25 (additions and alterations*); 44*	
Change in business inventories	52 (incl.*)	32 (manufacturing*); 47 (manufacturing and trade)	.....	20 (farm); 35*; 42 (farm*); 46*; 48	
Net exports of goods and services	4 (incl.*); 6 (incl.*); 26 (incl.*); 34 (incl.*)	10 (computers*); 38 (gold)	14 (imputed bank service charge, military shipments); 35 (services); 48 (border workers)	2 (computers*, services); 13; 14* (exclusion of Puerto Rico and U.S. territories); 20 (services); 25 (services); 30 (services); 35*; 38 (gold); 44*	
Government purchases of goods and services:					
Federal:					
National defense	27 (incl.*); 39*	3 (equipment and structures, incl.*); 10 (computers*); 24*; 28 (incl.*); 36	14 (compensation of employees); 48 several changes including compensation of employees)	2 (computers*); 14*; 35*; 44*; 48*	54
Nondefense .....	.....	3 (equipment and structures, incl.*); 9 (Commodity Credit Corporation); 10 (computers*); 25 (imputed financial services); 31; 36	48 (several changes, including imputed interest)	2 (computers*); 14 (Commodity Credit Corporation*); 44*	54 (Commodity Credit Corporation)
State and local .....	.....	3 (equipment and structures, incl.*); 10 (computers*); 25 (imputed financial services)	48 (several changes, including imputed interest)	2 (computers*); 30 (compensation of employees); 35*; 42 (compensation of employees); 44*; 48*	
Addendum:					
Command GNP	4 (incl.*); 6 (incl.*); 34	.....	.....	.....	
Gross domestic purchases .....	.....	.....	.....	35	



of the NIPA foreign transactions components, including the net exports component of GNP. In particular, describes the conceptual and statistical relationship between the NIPA foreign transactions and the balance of payments accounts. See also item 6.

5. "Gross Product by Industry, 1986." April 1987 SURVEY. Includes a summary of sources and methods for the estimates of GNP by industry, for which the current-dollar estimates are prepared as distributions by industry of the income-side components of the national income and product account.

6. "Foreign Transactions in the National Income and Product Accounts: An Overview." November 1986 SURVEY. Presents the conceptual basis and framework of foreign transactions in the NIPA's, describes the presentation of the estimates, and summarizes the sources and methods used to prepare them. See also item 4.

7. *The National Income and Product Accounts of the United States, 1929-82: Statistical Tables*, 1986 (GPO Stock No. 003-010-00174-7, price \$23.00). Includes a full set of definitions of NIPA aggregates and components, a brief discussion of constant-dollar estimates and price indexes, and descriptions of the classification of production by sector, legal form of organization, and industry.

8. "The U.S. National Income and Product Accounts: Revised Estimates, 1983-85 and First Quarter 1986." July 1986 SURVEY. Presents a regular annual revision. Describes methodological changes affecting State and local indirect business tax and nontax accruals (to include fines levied under Federal oil price regulations and paid to States as a nontax); corporate profits (adjustments for profits reported on the completed-contract method of accounting, for reversions of defined benefit pension plans, for employer contributions to tax-credit stock ownership plans, and for the amount of fines paid); farm proprietors' income and farm corporate profits (incorporating a defaulters' gain); and deflation procedures. The changes in deflation procedures affected personal consumption expenditures (for airline transportation, a BEA discount-adjusted price index; for computers, a BEA price index that incorporates detailed information on changes in prices and characteristics of computers) and producers' durable equipment (eliminating the lagging of price indexes previously needed to put them on a delivery basis). In describing revisions, presents summary methodologies for services in personal consumption expenditures and for net interest and personal interest income.

9. "Federal Farm Programs for 1986-90." April 1986 SURVEY. Includes a statement of the NIPA treatment of the transactions of the Commodity Credit Corporation.

10. "Improved Deflation of Purchases of Computers." March 1986 SURVEY. Presents the quality-adjusted deflators constructed by BEA for computers included in producers' durable equipment, exports and imports, and government purchases, primarily from price indexes developed by IBM Corporation. Discusses the selection of the index most appropriate for deflation of computers in GNP, the construction of the new deflators, and their use in the estimates presented in the comprehensive revision released in 1985. See also "The Economic Interpretation of Hedonic Methods" and "Quality-Adjusted Price Indexes for Computer Processors and Selected Peripheral Equipment" in the January 1986 SURVEY and "Corrections to the Estimates of Purchases of Computers" in the March 1986 SURVEY.

11. *The Use of National Income and Product Accounts for Public Policy: Our Successes and Failures*. BEA Staff Paper No. 43, 1986 (GPO Stock No. 003-010-00144-5; price \$3.75). Reviews the "accuracy" of NIPA estimates, using the size of the revisions to GNP as an indicator, and users' recommendations over the last 30 years for new and improved series, schedules of release, changes in concept and structure, etc.

12. "Revised Estimates of the National Income and Product Accounts of the United States, 1929-85: An Introduction." December 1985 SURVEY. Presents a comprehensive revision; see item 14. Includes notes on the effect of shifting the base period and on the revision of producers' durable equipment. Presents a table indicating new NIPA tables and items.

13. "A Note on Merchandise Trade Data." October 1985 SURVEY. Describes the changes in the Census Bureau monthly data on merchandise trade that are used as source data for the NIPA quarterly estimates. (Further changes were made in 1987; they were noted in the announcement of the consequent rescheduling of BEA's release of several estimates in the February 1987 SURVEY.)

14. "An Advance Overview of the Comprehensive Revision of the National Income and Product Accounts." October 1985 SURVEY. Describes definitional and classificational changes: Two relate to classification of certain business expenditures—replacement railroad track and major replacements to residential structures—as investment, three relate to Federal Government employee benefit programs, three relate to foreign transactions (one of which is described in item 12), and two relate to government assistance programs. Describes three methodological changes affecting a number of components—improved adjustments for misreporting on tax returns ("underground economy adjustments"—see item 21), improved estimates



of capital consumption allowances (based on new work on capital stock estimates), and exclusion of the Commonwealth of Puerto Rico and U.S. territories. Also describes a change affecting rental income of persons (improved accounting for expenses of homeownership); a shift from 1972 to 1982 in the base year for the calculation of constant-dollar estimates and price indexes; changes in deflation procedures; and a number of other methodological changes. The changes in deflation procedures affected the several components that include for computers (a BEA price index that incorporates detailed information on changes in prices and characteristics of computers—see item 10), nonresidential buildings, residential additions and alterations (see item 25), Commodity Credit Corporation purchases, national defense purchases, and net exports.

15. "Fixed Private Capital in the United States: Revised Estimates, 1925-81, and Estimates by Industry, 1947-81." July 1985 SURVEY. Includes a description of the investment flows used to implement the perpetual-inventory method of preparing the capital stock estimates and of the derivation of the associated estimates of depreciation. (See item 3 for an updated, fuller description.)

16. *Corporate Profits: Profits Before Tax, Profits Tax Liabilities, and Dividends*. BEA Methodology Paper Series MP-2, 1985 (GPO Stock No. 003-010-00143-7, price \$2.50) Describes the concepts, sources, and methods of the corporate profits components of the NIPA's.

17. "A Note on the Implicit Price Deflator." May 1985 SURVEY. Describes the implicit price deflator for GNP and contrasts it with the GNP fixed-weighted and chain price indexes. (A more technical explanation appears in "Alternative Measures of Price Change for GNP" in the March 1969 SURVEY.)

18. *Introduction to National Economic Accounting*. BEA Methodology Paper Series MP-1, 1985 (GPO Stock No. 003-010-00158-5, price \$1.00). Reprint of an article that appeared in the March 1985 SURVEY. Places the U.S. NIPA's within the larger framework of national economic accounting. Shows the step-by-step derivation of a general national economic accounting system from the conventional accounting statements used by business and government and inferred for other transactors. Also shows how the income and product accounts, the capital finance accounts, and input-output accounts—the major branches of national economic accounting in the United States today—are derived from this general system. Includes a list of suggestions for further reading.

19. "The Underground Economy: An Introduction." May and July 1984 SURVEY. In May, discusses the

coverage of the term "underground economy," a synopsis of measurement methods and results, and a survey of implications. In July, discusses illegal activities in the context of the NIPA's, three sets of NIPA estimates sometimes misunderstood as being measures of the underground economy (including the adjustments for misreporting described in item 21), and the effect on NIPA estimates of possible misreporting in source data due to the underground economy. An appendix in July shows the types of source data used to estimate the income and product components of GNP for a benchmark year. Includes a bibliography.

20. "The U.S. National Income and Product Accounts: Revised Estimates, 1981-83, and First and Second Quarters 1984." July 1984 SURVEY. Presents a regular annual revision. Describes methodological changes affecting service components of net exports (different data sources for foreign travel and the separation of remitted and reinvested earnings of unincorporated affiliates of U.S. residents and of foreign residents), quarterly patterns of farm inventories and cash receipts for crops, quarterly pattern of rental income of persons, and deflation of the space rent portions of personal consumption expenditures and housing output (a price index prepared by BEA). In describing the revisions, presents a summary methodology for net interest and personal interest income.

21. "Improved Adjustments for Misreporting of Tax Return Information Used to Estimate the National Income and Product Accounts, 1977." June 1984 SURVEY. Describes the use of tax return information in the NIPA's and the methodology for preparing improved adjustments for misreporting. The improved adjustments, sometimes referred to as the "underground economy adjustments," were included in personal consumption expenditures, gross private domestic investment, and several components of charges against GNP. The estimates for 1977, subsequently extended forward and backward to provide a time series, were included in the comprehensive revision released in 1985.

22. *State Personal Income: Estimates for 1929-82 and a Statement of Sources and Methods*. 1984 (GPO Stock No. 003-010-00125-9, price \$9.50). Provides a comprehensive statement of sources and methods used for estimating State personal income, much of which is relevant to the national estimates of income. (A major improvement has since been made in the methodology for nonfarm proprietors' income; see the August 1986 SURVEY.) Also presents two case studies of improvements over time—one referring to the definition of other labor income and one referring to the extension of coverage of unemployment insurance data in estimating wage and salary disbursements.



23. "Special Note.—Profits of Financial Corporations." November 1983 SURVEY. Includes a summary of coverage, concepts, and methodology.

24. "Implicit Price Deflators for Military Construction." November 1983 SURVEY. Presents some of the results of the project described in item 39.

25. "The U.S. National Income and Product Accounts: 1980-82 and First Quarter 1983." July 1983 SURVEY. Presents a regular annual revision. Describes methodological changes affecting a services component of net exports (a different data source for ocean freight and port charges), net interest paid by the rest of the world (refinements to the methodology of applying interest rates to the amounts outstanding in asset categories), and deflation of residential investment (a different price index for additions and alterations). In describing the revisions, presents summary methodologies for rental income of persons and rent of houses in personal consumption expenditures, for interest and imputed financial services (see item 8 for an updated methodology), and for proprietors' income.

26. "Net Exports of Goods and Services, 1980-82." March 1983 SURVEY. Includes a summary methodology for exports and imports of goods and services in current and constant dollars. (See item 4 for an updated, fuller description.)

27. "Special Note.—National Defense Purchases." November 1982 SURVEY. Includes a summary methodology. (See item 39 for a fuller description.)

28. "National Defense Purchases: Detailed Quarterly Estimates, 1977-82." November 1982 SURVEY. Introduces quarterly estimates at a more detailed level than previously available, based on the methodology summarized in item 27.

29. "Special Note.—Reinvested Earnings of Incorporated Affiliates in the National Income and Product Accounts." September 1982 SURVEY. Includes a summary methodology.

30. "The U.S. National Income and Product Accounts: Revised Estimates, 1977-81 and First Quarter 1982." July 1982 SURVEY. Presents an annual revision (covering 5 years). Describes methodological changes affecting quarterly estimates of gasoline purchases in personal consumption expenditures (a different indicator of volume), the space rent portion of personal consumption expenditures and rental income of persons (introduction of the average contract rent for tenant-occupied units to estimate the average rental value), net interest paid by the rest of the world (introduction of several different interest rates in the estimation of an appropriate interest rate to apply to amounts outstanding in the categories of claims and liabilities re-

ported by U.S. banks), and compensation of State and local government employees (different data on wages and salaries).

31. "Special Note.—The Commodity Credit Corporation in the National Income and Product Accounts." January 1982 SURVEY. Includes a summary methodology.

32. "Constant-Dollar Manufacturing Inventories." November 1981 SURVEY. Describes the methodology for manufacturing inventories introduced in the comprehensive revision released in 1980. Introduces the constant-dollar estimates of manufacturing inventories by stage of fabrication made possible by the improved methodology.

33. "Special Note.—Personal Interest Income." September 1981 SURVEY. Includes a summary methodology.

34. "International Transactions in Measures of the Nation's Production." May 1981 SURVEY. Introduces the measures of command-basis GNP and terms of trade; discusses the scope and deflation of international flows of factor income, focusing on the addition of reinvested earnings of incorporated foreign affiliates to the factor income flows and on the use of the deflator for net domestic product (both introduced in the comprehensive revision released in 1980); and describes the methodology for deflating other components of exports and imports (see item 4 for an updated, fuller description).

35. "The National Income and Product Accounts of the United States: An Introduction to the Revised Estimates for 1929-80." December 1980 SURVEY. Presents a comprehensive revision. Describes definitional and classificational changes, most importantly the change that adds reinvested earnings of incorporated foreign affiliates of U.S. direct investors and subtracts the reinvested earnings of incorporated U.S. affiliates of foreign direct investors from the factor income components of net exports. Also describes the elimination of capital gains from earnings of unincorporated foreign affiliates, the reclassification of earnings of unincorporated foreign affiliates to dividends, and the reclassification of hotels and motels to nonresidential structures. Introduces several new aggregates, including gross domestic purchases. Describes methodological changes affecting income components (a number of changes, affecting proprietors' income, corporate profits, and net interest), producers' durable equipment (use of the abbreviated commodity-flow method alone rather than as part of an average), net exports (a new treatment of gold—see item 38), and deflation procedures. The changes in deflation procedures affected personal consumption expenditures (a new price index for hospital



expenditures), change in business inventories (see item 32), net exports (including a conceptual change for factor services—see item 34), government purchases (more detail for national defense—see item 39—and for State and local), and the statistical discrepancy. Presents a table indicating new NIPA tables and items.

36. "Federal Fiscal Programs." February 1980 SURVEY. Includes a discussion, built around reconciliation tables, of the differences between unified budget concepts, as presented in the "Budget of the United States," and NIPA concepts of receipts, expenditures (including purchases), and national defense purchases. (The tables are updated annually.)

37. "Monthly Estimates of Personal Income, Taxes, and Outlays." November 1979 SURVEY. Prepared when the introduction of monthly estimates of four kinds of outlays—personal taxes and nontax payments, personal consumption expenditures (in current and constant dollars), interest paid to consumers, and personal transfer payments to foreigners—completed the monthly presentation of all components of the personal income and outlay account. Describes the methodology for the annual and monthly estimates (quarterly estimates are the sum of monthly estimates) of personal income and its components; of personal tax and nontax payments, personal outlays, and personal saving; and of the constant-dollar estimates and related series.

38. "Revision of NIPA Estimates." July 1979 SURVEY. Presents a regular annual revision. Describes a change, mainly affecting net exports, in the treatment of gold.

39. *Price Changes of Defense Purchases of the United States*. 1979 (NTIS Accession No. PB-80217359). Discusses the results of a major project, started in the mid-1970's by BEA in cooperation with the Department of Defense, to develop price indexes at a detailed level using data provided by the Department of Defense.

40. "The Farm Sector." November 1978 SURVEY. Includes a methodology for farm income and also for farm output and product.

41. "Key Source Data and Projections for National Income and Product Estimates: Third Quarter 1978." October 1978 SURVEY. Presents tables showing monthly data sources for current-dollar GNP components and for deflation at the time of the preliminary quarterly estimates. (Although not currently published in the SURVEY, the tables are available each quarter.)

42. "Revisions of NIPA Estimates." July 1978 SURVEY. Presents a regular annual revision. Describes methodological changes affecting auto repairs in personal consumption expenditures (a new method based on mileage driven), Federal transfer payments (reclas-

sification of Federal payments to nonprofit institutions for training the unemployed, previously treated as a purchase), contributions for social insurance (a new data source for contributions by State and local governments to pension plans for their employees), and deflation procedures. The changes in deflation procedures affected personal consumption expenditures (for brokerage charges and investment counseling, a new BEA price series; for food, improved weights for the composite price index and new information on imported food) and change in business inventories (for farm inventories, improved weights).

43. "Reconciliation of Quarterly Changes in Measures of Prices Paid by Consumers." March 1978 SURVEY. Describes three measures: The implicit price deflator for personal consumption expenditures and the chain price index for personal consumption expenditures, both prepared by BEA, and the Consumer Price Index, prepared by the Bureau of Labor Statistics. The reconciliation, which was based on the Consumer Price Index available prior to January 1978, has been discontinued.

44. "Revisions of the NIPA's." July 1977 SURVEY. Presents a regular annual revision. Describes methodological changes affecting the deflation of fixed investment and government purchases (introduction of a lagging procedure for one of the construction price indexes and revisions in the lags applied to the price indexes for equipment to put them on a delivery basis) and of net exports (application of price indexes at a more detailed level).

45. "Reconciliation of BEA Compensation and BLS Earnings." May 1977 SURVEY. Describes the two frequently used series on hourly compensation; the reconciliation table continues to be published each quarter in the SURVEY.

46. "Revisions of the NIPA's." July 1976 SURVEY. Presents a regular annual revision. Describes a methodological change affecting the change in business inventories (use of a more detailed procedure in preparing constant-dollar estimates).

47. "Manufacturing and Trade Inventories and Sales in Constant-Dollars, 1959 to First Quarter 1976." May 1976 SURVEY. Includes a methodology for constant-dollar stocks of inventories. (Item 32 includes an updated methodology for manufacturing inventories.)

48. "The National Income and Product Accounts of the United States: Revised Estimates, 1929-74." January 1976 SURVEY, Part I. Presents a comprehensive revision. Describes the definitional and classificational changes, including those made to capital formation and consumption (including the introduction of the capital consumption adjustment—see item 50) and to gov-



ernment transactions (including reclassification of interest paid by the Federal Government to foreigners and introduction of imputed interest receipts and imputed charges for services furnished without payment by financial intermediaries). Describes the methodological changes affecting the motor vehicles components (see item 49), change in business inventories (mainly the introduction of information that permits a better separation of book value inventories according to the accounting method underlying them), producers' durable equipment (valuation of computers leased by the manufacturers to others at cost and inclusion of nuclear reactor fuel elements and control rods), government purchases (a change in procedures for converting information on local governments from a fiscal year basis to a calendar year basis and inclusion of certain receipts as negative State and local purchases), and deflation procedures. The changes in deflation procedures affected personal consumption expenditures (food and financial services), construction (see item 53), producers' durable equipment (see item 51), and government purchases (an approximation of specification pricing for employee services and new detail on purchases from business). Also describes the shift from 1958 to 1972 in the base year for the calculation of constant-dollar estimates and price indexes and the methodology for preparing constant-dollar estimates of nonfactor charges (indirect business tax and nontax liability, subsidies less the current surplus, and business transfer payments) that made possible the presentation of several new constant-dollar aggregates, notably national income. Presents exhibits indicating new NIPA tables and items.

49. "Vehicles: Recent Developments and Treatment in the GNP Accounts," November 1975 SURVEY. Summarizes the methodology (including improvements introduced in the comprehensive revision released in 1976) used to estimate the auto and truck components of the expenditure components of GNP.

50. "New Estimates of Capital Consumption Allowances in the Benchmark Revision of GNP," October 1975 SURVEY. Describes the concept and methodology for the adjustment, introduced in the comprehensive revision released in 1976, that converts tax-return-based measures of depreciation to measures that are based

on consistent accounting and valued at current replacement cost.

51. "Improved Deflation of Producers' Durable Equipment." July 1975 SURVEY. Describes the use of the Wholesale Price Index (now Producer Price Indexes) and other price indexes, featuring a timing adjustment to place the indexes on the delivery basis needed for the NIPA's. (As of July 1986, the adjustment was no longer needed for the Producer Price Indexes; see item 8.)

52. *Quarterly GNP Estimates Revisited in a Double-Digit Inflationary Economy*. BEA Staff Paper No. 25, 1974 (NTIS Accession No. COM 75-10042). Summarizes the sources and methods used to estimate current-dollar quarterly GNP and quarterly national income and to deflate quarterly GNP (tables 2 and 3 in this article are more up to date). Describes the sources and methods used to estimate inventories and the inventory valuation adjustment.

53. "Revised Deflators for New Construction, 1947-73." August 1974 SURVEY, Part I. Describes the price indexes from government agencies and trade sources used to calculate the deflators for each type of construction activity. (Several changes in methodology were made later.)

54. "U.S. National Income and Product Accounts, 1970-73." July 1974 SURVEY. Presents a regular annual revision. Introduces two new tables: A reconciliation of national defense outlays in the unified budget and NIPA national defense purchases (see item 36) and a reconciliation of the Commodity Credit Corporation's outlays in the unified budget and its NIPA expenditures (see items 31 and 9).

Publications for which an NTIS accession number is given can be ordered from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. Publications for which a GPO stock number is given can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402. See "A User's Guide to BEA Information" in the February 1987 SURVEY for additional information about BEA's publications.



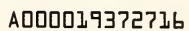
Methodology Papers: The National Income and Product Accounts

Bureau of Economic Analysis
U.S. Department of Commerce

1. *Introduction to National Economic Accounting*. Methodology Paper Series MP-1, March 1985.
2. *Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends*. Methodology Paper Series MP-2, May 1985.
3. *Foreign Transactions*. Methodology Paper Series MP-3, May 1987.
4. *GNP: An Overview of Source Data and Estimating Methods*. Methodology Paper Series MP-4, September 1987.

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